CRITICAL TRENDS ASSESSMENT PROGRAM

Volume 4

Socio-Economic Profile
Environmental Quality
Archaeological Resources

DU PAGE RIVER AREA ASSESSMENT

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

DU PAGE RIVER AREA ASSESSMENT

VOLUME 4

Part I: Socio-Economic Profile
Illinois Department of Natural Resources
Office of Realty and Environmental Planning
Division of Energy and Environmental Assessment
524 South Second
Springfield, Illinois 62701
(217) 524-0500

Part II: Environmental Quality
Illinois Department of Natural Resources
Office of Scientific Research and Analysis
Illinois State Water Survey
2204 Griffith Drive
Champaign, Illinois 61820
(217) 244-5459
Waste Management and Research Center
One East Hazelwood Drive
Champaign, Illinois 61820
(217) 333-8940

Part III: Archaeological Resources
Debra K. Loveless and Steve R. Ahler
Illinois Department of Natural Resources
Office of Scientific Research and Analysis
Illinois State Museum
Spring & Edward Streets
Springfield, Illinois 62706
(217) 782-7387

1999

Rod R. Blagojevich, Governor
State of Illinois

Joel Brunsvold, Director
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702

Other CTAP Publications

Du Page River Area Assessment
Vol. 1 *Geology*
Vol. 3 *Living Resources*
Vol. 4 *Socio-Economic Profile, Environmental Quality and Archaeological Resources*
Du Page River Basin: An Inventory of the Region's Resources
— 22-page color booklet

Descriptive inventories and area assessments are also available for the following regions:

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Cache River
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Illinois River Bluffs
Spoon River
Driftless Area
Lower Rock River
Sinkhole Plain
Sugar-Pecatonica Rivers
Vermilion River
Upper Sangamon River

Also available:

Illinois Land Cover, An Atlas, plus CD-ROM
Inventory of Ecologically Resource-Rich Areas in Illinois
EcoWatch '98, Annual Report of the Illinois EcoWatch Network
Illinois Geographic Information System, CD-ROM of digital geospatial data

All CTAP and Ecosystems Program documents are available from the DNR Clearinghouse at (217) 782-7498 or TDD (217) 782-9175. Selected publications are also available on the World Wide Web at http://dnr.state.il.us/ctap/ctaphome.htm, or http://dnr.state.il.us/c2000/manage/partner.htm, as well as on the EcoForum Bulletin Board at 1 (800) 528-5486 or (217) 782-8447.

For more information about CTAP, call (217) 524-0500 or e-mail at ctap2@dnrmail.state.il.us; for information on the Ecosystems Program call (217) 782-7940 or e-mail at ecoprog@dnrmail.state.il.us.

About This Report

The *Du Page River Area Assessment* examines approximately 372 square miles in northeastern Illinois. Because significant natural community and species diversity has been found in the watershed, a portion of the assessment area has been designated a state "Resource Rich Area".[1]

This report is part of a series of reports on areas of Illinois where a public-private partnership has been formed to protect natural resources. These assessments provide information on the natural and human resources of the areas as a basis for managing and improving their ecosystems. The determination of resource rich areas and development of ecosystem-based information and management programs in Illinois are the result of three processes — the Critical Trends Assessment Program, the Conservation Congress, and the Water Resources and Land Use Priorities Task Force.

Background

The Critical Trends Assessment Program (CTAP) documents changes in ecological conditions. In 1994, using existing information, the program provided a baseline of ecological conditions.[2] Three conclusions were drawn from the baseline investigation:

1. the emission and discharge of regulated pollutants over the past 20 years has declined, in some cases dramatically,
2. existing data suggest that the condition of natural ecosystems in Illinois is rapidly declining as a result of fragmentation and continued stress, and
3. data designed to monitor compliance with environmental regulations or the status of individual species are not sufficient to assess ecosystem health statewide.

Based on these findings, CTAP has begun to develop methods to systematically monitor ecological conditions and provide information for ecosystem-based management. Five components make up this effort:

1. identify resource rich areas,
2. conduct regional assessments,
3. publish an atlas and inventory of Illinois landcover,
4. train volunteers to collect ecological indicator data, and
5. develop an educational science curriculum which incorporates data collection

At the same time that CTAP was publishing its baseline findings, the Illinois Conservation Congress and the Water Resources and Land Use Priorities Task Force were presenting their

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[1] See *Inventory of Resource Rich Areas in Illinois: An Evaluation of Ecological Resources*.
[2] See *The Changing Illinois Environment: Critical Trends*, summary report and volumes 1-7.

respective findings. These groups agreed with the CTAP conclusion that the state's ecosystems were declining. Better stewardship was needed, and they determined that a voluntary, incentive-based, grassroots approach would be the most appropriate, one that recognized the inter-relatedness of economic development and natural resource protection and enhancement.

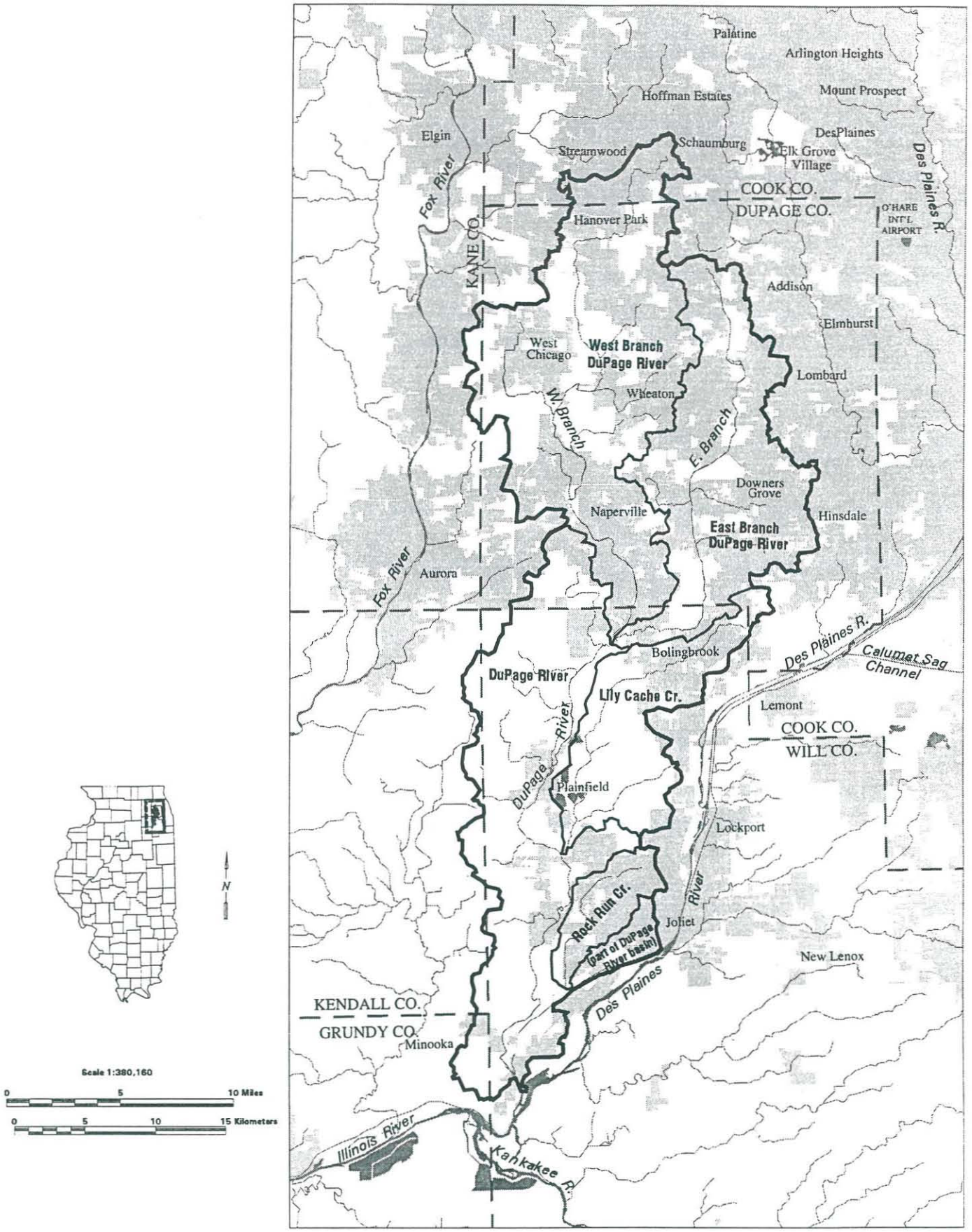
From the three initiatives was born Conservation 2000, a six-year program to begin reversing ecosystem degradation, primarily through the Ecosystems Program, a cooperative process of public-private partnerships that are intended to merge natural resource stewardship with economic and recreational development. To achieve this goal, the program provides financial incentives and technical assistance to private landowners. The Rock River and Cache River were designated as the first Ecosystem Partnership areas.

At the same time, CTAP identified 30 Resource Rich Areas (RRAs) throughout the state. In RRAs and other areas where Ecosystem Partnerships have been formed, CTAP is providing an assessment of the area, drawing from ecological and socio-economic databases to give an overview of the region's resources — geologic, edaphic, hydrologic, biotic, and socio-economic. Although several of the analyses are somewhat restricted by spatial and/or temporal limitations of the data, they help to identify information gaps and additional opportunities and constraints to establishing long-term monitoring programs in the partnership areas.

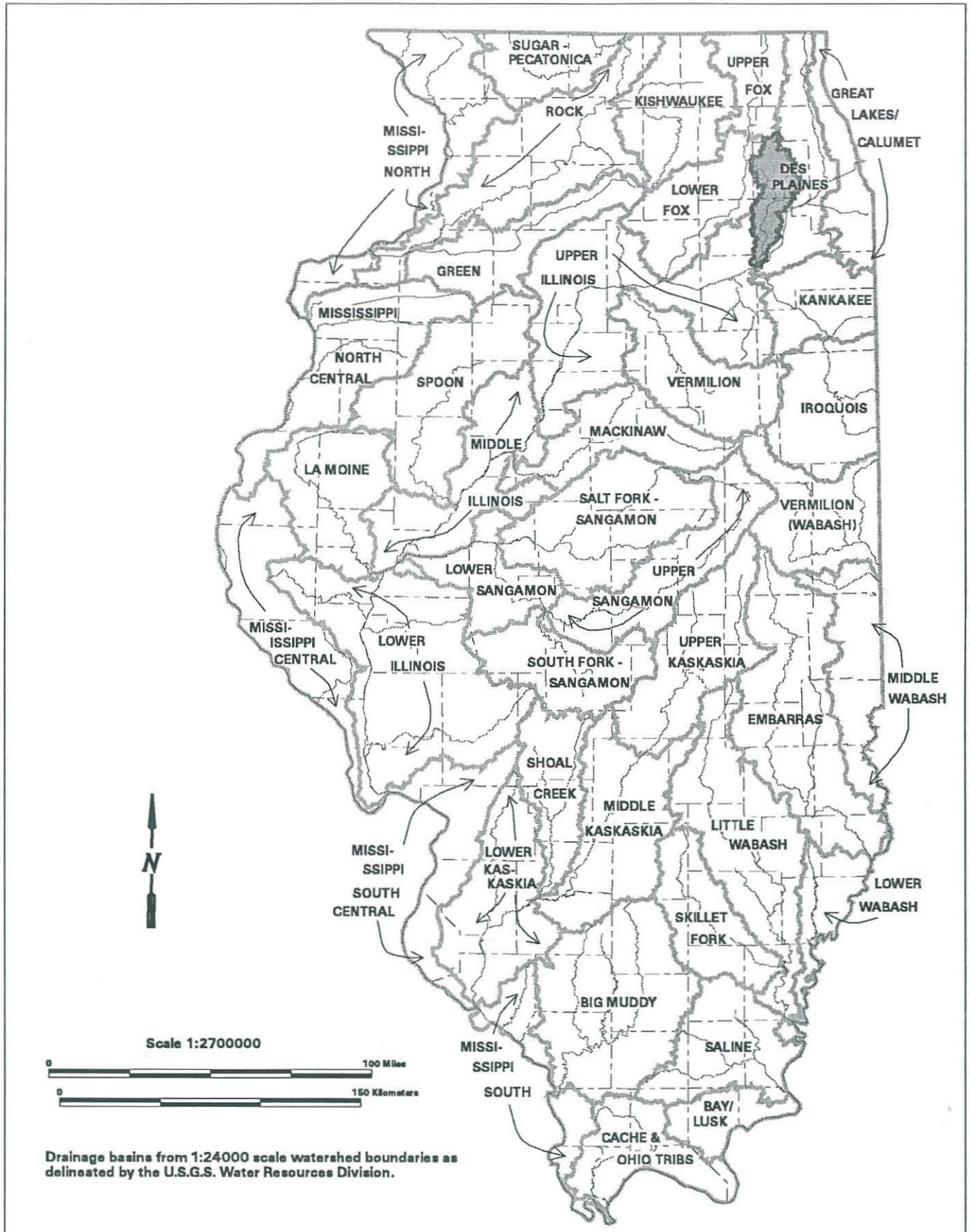
The Du Page River Area Assessment

The Du Page River area encompasses approximately 372 square miles (238,462 acres) in northeastern Illinois, mostly in Du Page and Will Counties, with small portions in Cook, Kane, Kendall, and Grundy Counties. The area is one of the most heavily urbanized in the state. It encompasses six subbasins along the Du Page River, of which one (East Branch Du Page River) has been designated a "Resource Rich Area" because it contains significant natural community diversity. The Upper Du Page River Ecosystem Partnership was subsequently formed around this core area of high quality ecological resources.

This assessment is comprised of four volumes. In Volume 1, *Geology* discusses the geology, soils, and minerals in the assessment area. Volume 2, *Water Resources*, discusses the surface and groundwater resources and Volume 3, *Living Resources*, describes the natural vegetation communities and the fauna of the region. Volume 4 contains three parts: Part I, *Socio-Economic Profile*, discusses the demographics,



Subbasins in the DuPage River Assessment Area. Subbasin boundaries depicted are those determined by the Illinois Environmental Protection Agency.



Drainage basins from 1:24000 scale watershed boundaries as delineated by the U.S.G.S. Water Resources Division.

Major drainage basins of Illinois and location of the DuPage River Assessment Area

infrastructure, and economy of the area, focusing on Will and Du Page counties; Part II, *Environmental Quality*, discusses air and water quality, and hazardous and toxic waste generation and management in the area; and Part III, *Archaeological Resources*, identifies and assesses the archaeological sites known in the area.

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SOCIO-ECONOMIC PROFILE

Contributors

Project Coordinator	David Baker
Editors	David Baker, Karen Miller
Maps	John Bishop, Will Hinsman
Summary	David Baker
Demographic Trends	Karen Miller
Health Trends	Wayne Hartel
The Regional Economy	Mark Bonardelli
Agriculture	Tom Heavisides
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Summary

The Du Page River flows through the suburbs west of Chicago and discharges into the DesPlaines River just before its confluence with the Kankakee and Illinois Rivers. The East Branch of the Du Page is considered a resource-rich area because of the woodlands and wetlands located in the county forest preserves and Morton Arboretum. This report profiles the socio-economic characteristics of the two main counties[1] through which the Du Page River and its tributaries flow — Du Page and Will.[2] It provides a historical perspective as well as a current picture of the human-related resources of the region.

The Du Page River area is one of the most highly urbanized areas in the state and in 1990 was home to 10% of the state's population. Ninety-six percent of area residents live in urban areas and 31% of the land is put to urban uses. The area's population grew from about 50,000 in 1870 to over 1.1 million in 1990. Just in the last 20 years the population of the area has grown by more than 50%. The area's two largest cities are currently Joliet and Naperville, the latter having a population that is approaching 100,000.

The area is generally very affluent. In 1990 per capita income averaged $6,068 higher than the statewide average and the poverty rate was 4% , well below the statewide rate of 12%. More than 30% of adult residents have finished college compared to 21% statewide. The area's annual mortality rate is 33% below that statewide, reflecting the much lower elderly population (8.7%) than the state as a whole (12.6%). Will County, in particular, ranks first in proportion of the population under 19 years of age.

The property tax base has grown by 115% during the last 25 years and the mean value of housing in the Du Page River area is now about $50,000 above the state average. Property tax revenues have grown by 132%, yet tax rates are about 20% lower than the state average and have remained fairly level since 1980 in constant dollars.

The Du Page River area has a very healthy economy. In 1995, the area employed nearly 800,000 people with $39.1 billion in personal income. Du Page County, with the larger of the two economies, accounted for about 80% of employment and 84% of income. During the period 1970-1995, Du Page County experienced especially strong

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[1] The Du Page River watershed is located primarily in Du Page and Will counties but includes small parts of Cook, Kane, and Kendall counties. The Upper Du Page Ecosystem Partnership focuses on the part of the watershed above the confluence of the East Branch with the main branch of the Du Page River. This volume focuses on Du Page and Will counties, although the natural resource volumes encompass the entire watershed.

[2] While the accompanying natural resources assessment emphasizes the watershed as its unit of analysis, socio-economic data are displayed geographically using the 928 census block groups defined by the U.S. Census Bureau to encompass the two counties. Census block groups are small, sub-county level areas delineated by the U.S. Census Bureau for purposes of the decennial census. They are designed to be relatively homogeneous with respect to population characteristics, economic status, and living conditions. In practice they vary considerably in population and size. In the two-county area, the census block groups range from 5 to 5,035 in population and from 16 acres to 25,729 acres in land area.

employment growth, 5.9% annually, although Will County's growth rate, 2.3% annually, was also twice the rate statewide.

Between 1970 and 1995 the services sector experienced tremendous growth in the area, increasing 250% in Will County and 500% in Du Page County. All other sectors grew significantly as well, with two exceptions. Farming, a minor source of employment, declined in both counties. In addition, manufacturing employment declined in Will County by about 40% during the early 1980s recession but has grown steadily during the 1990s. In Du Page County, manufacturing employment more than doubled, although services and related sectors dominate the economy. The 28 largest employers are from the services, wholesale/retail, transportation, utility, FIRE, and government sectors.

Between 1973 and 1995, nearly 1,500 miles of road were added in the area, an increase of one-third. During the same time period annual vehicle-miles traveled (VMT) more than doubled. The area contains 4.3% of the state's roads and experiences 11.45% of its VMT. Since 1980 annual VMT has grown at a torrid pace of 4% annually.

Although the Du Page River area has a large urban population, crops are grown on 46% of the land in Will County and 7.3% in Du Page County, mostly outside of the actual Du Page River watershed. With the large suburban growth in the area, farm acreage and the number of farms have declined significantly, by nearly 60% in Du Page County and 30% in Will County during the last 15 years. What farms remain are much more likely than in other parts of the state to grow specialty crops such as vegetables, melons and other fruits. The area produces 14% of the state's nursery and greenhouse crops. Overall, Du Page River area counties produce $141 million in farm cash receipts annually, less than 2% of Illinois' total.

The Du Page River watershed does not contain any major state- or federally-owned outdoor recreation areas, although the Du Page County Forest Preserve District operates more than twenty preserves. More than 2.3 million people visited the forest preserves in the fiscal year ending in 1997.[3] The Blackwell, Herrick Lake, and Danada preserves, clustered in west-central Du Page County near Warrensville, are the three most popular sites with combined attendance of more than 600,000. These sites support fishing, boating, canoeing, camping, and picnicking and provide access to the regional trail system. The Du Page River area also contains four state nature preserves and twelve natural areas. The largest natural area is located at the Morton Arboretum, a 1,700 acre facility that features beautiful gardens and landscapes, a world renowned research program, and an extensive education program.

The human resources of the Du Page River area provide an important context for future plans to manage and preserve the unique and ample natural resources of the area. This report is part of an overall assessment of the area's natural and human resources.

[3] Attendance data provided by the Du Page County Forest Preserve District.

Demographic Trends

The character of an area is determined not only by its natural environment, but also by its human environment — the size, growth, density, distribution and characteristics of the population living there. The following section describes population growth and distribution, and trends in age, income, education, households, and housing in the Du Page River area.

Population

Between 1870 and 1990 the combined population of Du Page and Will counties grew approximately 1,800%, more than five times the 350% statewide growth. The two counties are part of the Chicago Primary Metropolitan Statistical Area and in 1990 accounted for 10% of the state's population.[1]

1990
Du Page River Area
Square miles: 1,171.7
Population: 1,138,979

Density: 972.1 persons per sq. mi.
Urban population: 94.2%
16 cities
46 villages

Although both counties have had impressive growth rates, Du Page County grew from 16,685 to 781,666 residents over the 120-year period, nearly a forty-seven fold increase. In 1990 Du Page County was the second largest county in the state, while Will County was fourth largest. Figure 1-1 shows that growth in both counties became more accelerated after 1950, when suburbanization increased in the Chicago area.

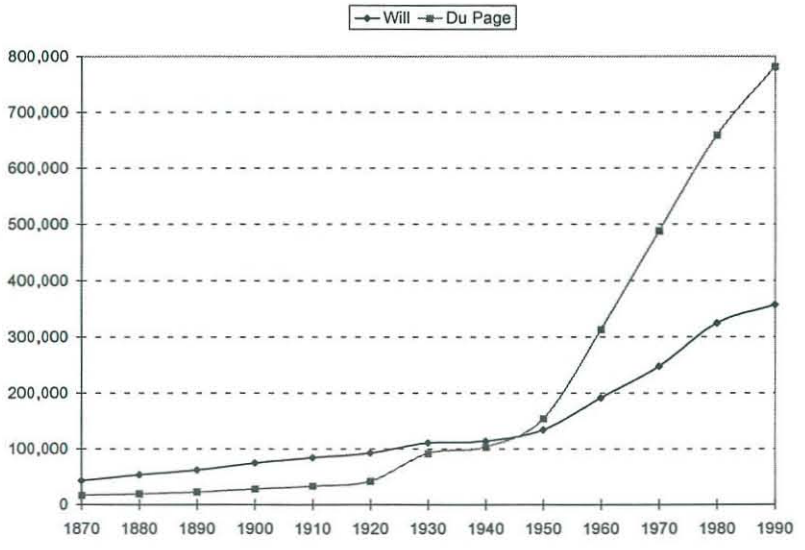


Figure 1-1. Population Trends

[1] Population data was taken from the *1993 Illinois Statistical Abstract.*

Figure 1-2. Municipalities and Major Highways

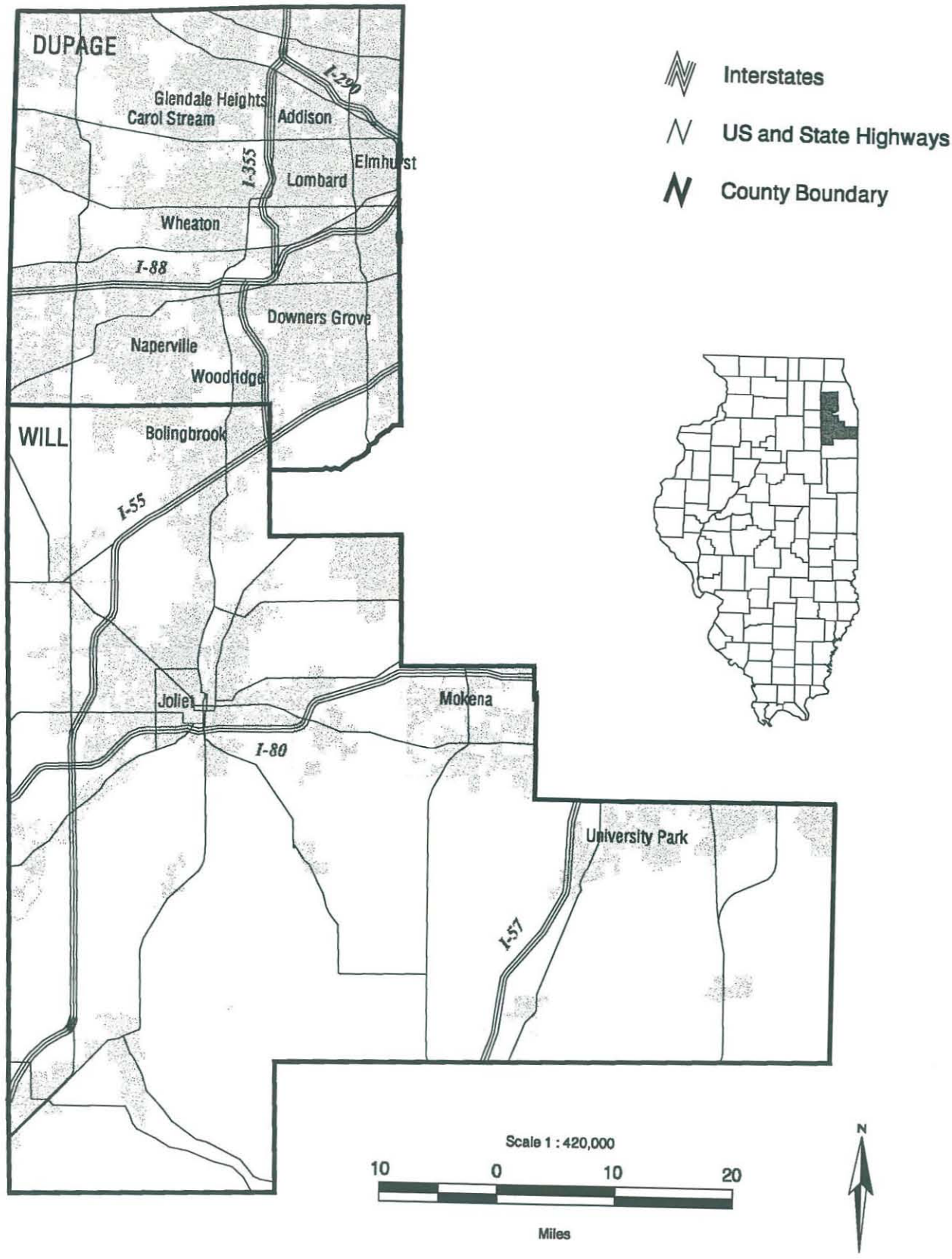


Table 1-1. Population

	1990 Population	% of Illinois Population	County Rank[2]	% change, 1970-1990
Will	357,313	3.1%	4	44%
Du Page	781,666	6.8%	2	60%
Region	1,138,979	10%	--	55%
Illinois	11,430,602	100.0%	--	2.9%

In Will County, population grew more than eightfold over the 120-year time period and is projected to add more than 232,000 new residents by the year 2020, a 65% increase. Du Page County is projected to grow 37%, adding almost 300,000 more residents.

Urban Population

Only 6% of the area's population lives in rural communities (less than 2,500 population); the urban population is almost 10% above the statewide average.[2] Between 1970 and 1990, the proportion of urban residents increased almost 7% and density grew from 628 to 972 persons per square mile. Several large cities and villages lie within the area. Naperville is the largest city lying entirely within Du Page County and Joliet is the largest in Will County (Table 1-4).

Urban Land Use

According to satellite imagery taken between 1992 and 1994, 31% of the land in the area is used for urban purposes, far more than the statewide average of 5.8%.[3] (As used here, urban land includes low, medium and high density urban land, transportation, and urban grasslands.) Most of the urbanization has occurred in Du Page County, which had 65% urban land compared to only 18% in Will County.

Table 1-2. Population Density*

	1870	1910	1950	1990
Will	51.4	100.8	160.4	426.8
Du Page	49.9	100.0	462.3	2337.2
Region	50.9	100.5	246.6	972.1
Illinois	45.7	101.5	156.8	205.7

* persons per square mile

Table 1-3. Urban Acreage

	Urban acres	% of county
Will	98,210	18%
Du Page	139,340	65%
Region	237,550	31%
Illinois	2,087,390	6%

[2] Urbanization data from 1990 and 1993 *Illinois Statistical Abstract.*
[3] *Illinois Landcover, An Atlas*, IL Department of Natural Resources, June 1996.

Table 1-4. Incorporated Municipalities, 1990

	City or village	1990 Population
Will County		
Beecher	V	2,032
Braidwood	C	3,584
Channahon	V	4,266
Crest Hill	C	10,999
Crete	V	6,773
Elwood	V	951
Frankfort	V	7,180
Godley	V	322
Joliet	C	77,217
Lockport	C	9,401
Manhattan	V	2,059
Mokena	V	8,450
Monee	V	1,044
Naperville (also in Du Page Co.)	C	92,885
New Lenox	V	10,563
Park Forest (also in Cook Co.)	V	24,656
Peotone	V	2,947
Plainfield	V	4,557
Rockdale	V	1,717
Romeoville	V	14,101
Shorewood	V	6,264
Steger (also in Cook Co.)	V	8,592
Symerton	V	110
Tinley Park (also in Cook Co.)	V	39,679
University Park (also in Cook Co.)	V	6,204
Wilmington	C	4,743
Woodridge (also in Du Page Co.)	V	26,359
Du Page Co.		
Addison	V	32,053
Aurora (also in Kane Co.)	C	99,556
Bartlett (also in Cook and Kane Co.)	V	26,979
Bensenville	V	17,767
Bloomingdale	V	16,614
Bolingbrook (also in Will Co.)	V	40,843
Burr Ridge	V	7,669
Carol Stream	V	31,759
Clarendon Hills	V	6,994
Darien	C	20,287
Downers Grove	V	46,845
Elmhurst	C	42,029
Glendale Heights	V	27,915
Glen Ellyn	V	24,944
Hanover Park (also in Cook Co.)	V	32,895
Hinsdale	V	16,029
Itasca	V	6,947
Lisle	V	19,584
Lombard	V	39,408
Naperville (also in Will Co.)	C	92,885
Oakbrook Terrace	C	2,251
Oak Brook	V	9,087
Roselle	V	20,819
St. Charles (also in Kane Co.)	C	23,847
Villa Park	V	22,279
Warrenville	C	11,389
Wayne (also in Kane Co.)	V	1,524
West Chicago	C	14,808
Westmont	V	21,402
Wheaton	C	51,441
Willowbrook	V	8,701
Willow Springs (also in Cook Co.)	V	4,478
Winfield	V	7,675
Wood Dale	C	12,394
Woodridge (also in Will Co.)	V	26,359

Source: Illinois Counties & Incorporated Municipalities, December 1, 1993, Illinois Secretary of State.

Land use information is also available from the U.S. Department of Agriculture Soil Conservation Service, which has conducted a National Resources Inventory (NRI) in 1982, 1987 and 1992 (Figure 1-3).[4] According to the NRI, between 1982 and 1992 urban land use grew 18% in the two-county area, compared to a 14% increase statewide. Although the greatest increase occurred in Will County, up 19.2%, Du Page County continues to convert land to urban uses, with an 18% increase. During a similar time frame, the number of urban residents in the area increased only 7%.

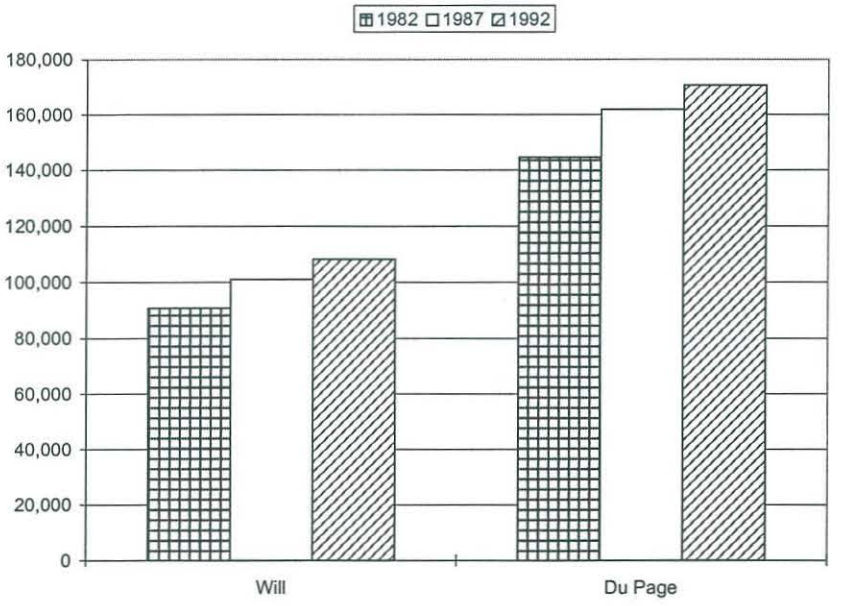


Figure 1-3. Urban Land Use (acres)

Population Characteristics

Age

The age distribution of the two-county area is somewhat similar to that of Illinois as a whole — in 1990 30% of the population was under the age of 19 compared to 29% statewide. However, the area has a smaller percentage of people over age 64 — 8.7% compared to 12.5% statewide. Like the rest of the state (and nation), the population in the Du Page River area is aging — in 1970, the young made up 42% of the population and the elderly 6.2%.[5]

1990
Du Page River Area
Age 0-19: 30%
Age 65+: 8.7%
Median age: 32

Per capita income: $29,204
Persons in poverty: 3.7%
Minorities: 9%
Females/males: 50/50

High school education: 86.1%
College education: 30.6%

[4] Because different methodologies are used and the data are collected from representative sample points in each state, the NRI data vary slightly from the satellite data.
[5] Age, race and education data from the *1997 State Profile*, Woods & Poole Economics, Inc.

In 1990 Will County ranked 101st in the state (out of 102 Illinois counties) in the percentage of elderly residents, and 1st in the percentage of youths aged 0-19. Du Page County ranked 100th and 37th respectively. By 2020, the number of elderly people is projected to increase in both counties — from 9% to 12% in Will County, and 8.7% to 12.3% in Du Page County.

Between 1970 and 1990 median age increased 5.8 years in the two-county area. This compares to a statewide median age increase of 4.4 years. Du Page County had the higher median age, 32.4 years.

Table 1-5. Median Age

	1970	1980	1990
Will	26.1	27.6	31.2
Du Page	26.3	29.4	32.4
Region	26.2	28.8	32.0
Illinois	28.4	29.9	32.8

Figure 1-5 shows age distribution by census block group. The predominantly younger populations are concentrated along the western edge of Du Page County, and in Naperville, Woodridge, Glendale Heights and Carol Stream. In Will County, they are concentrated in the central portion of Joliet, and in most of the rural areas. The older populations live in the western and southern portions of Joliet and the far east side of Will County and along the eastern portion of Du Page County, in Addison, Lombard, Elmhurst and Downers Grove.

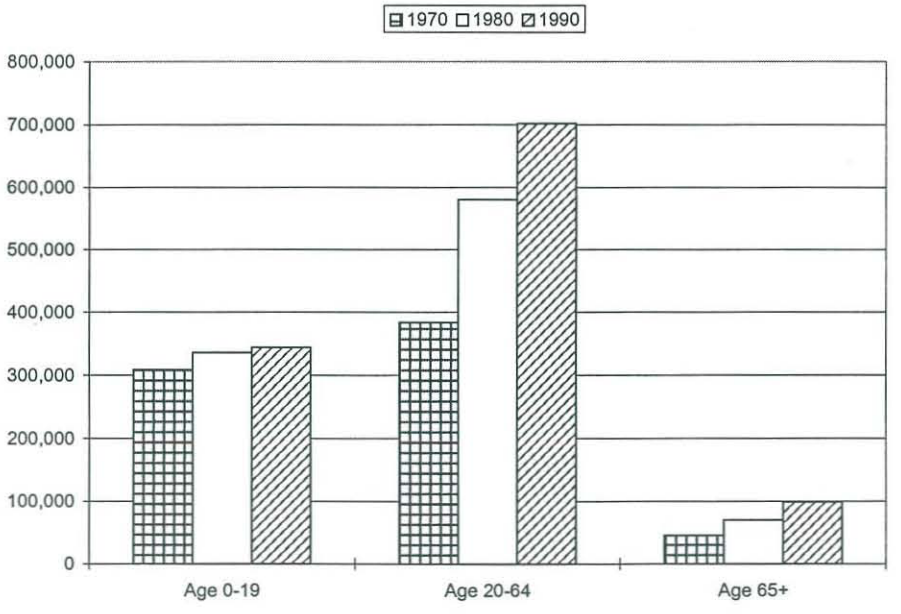
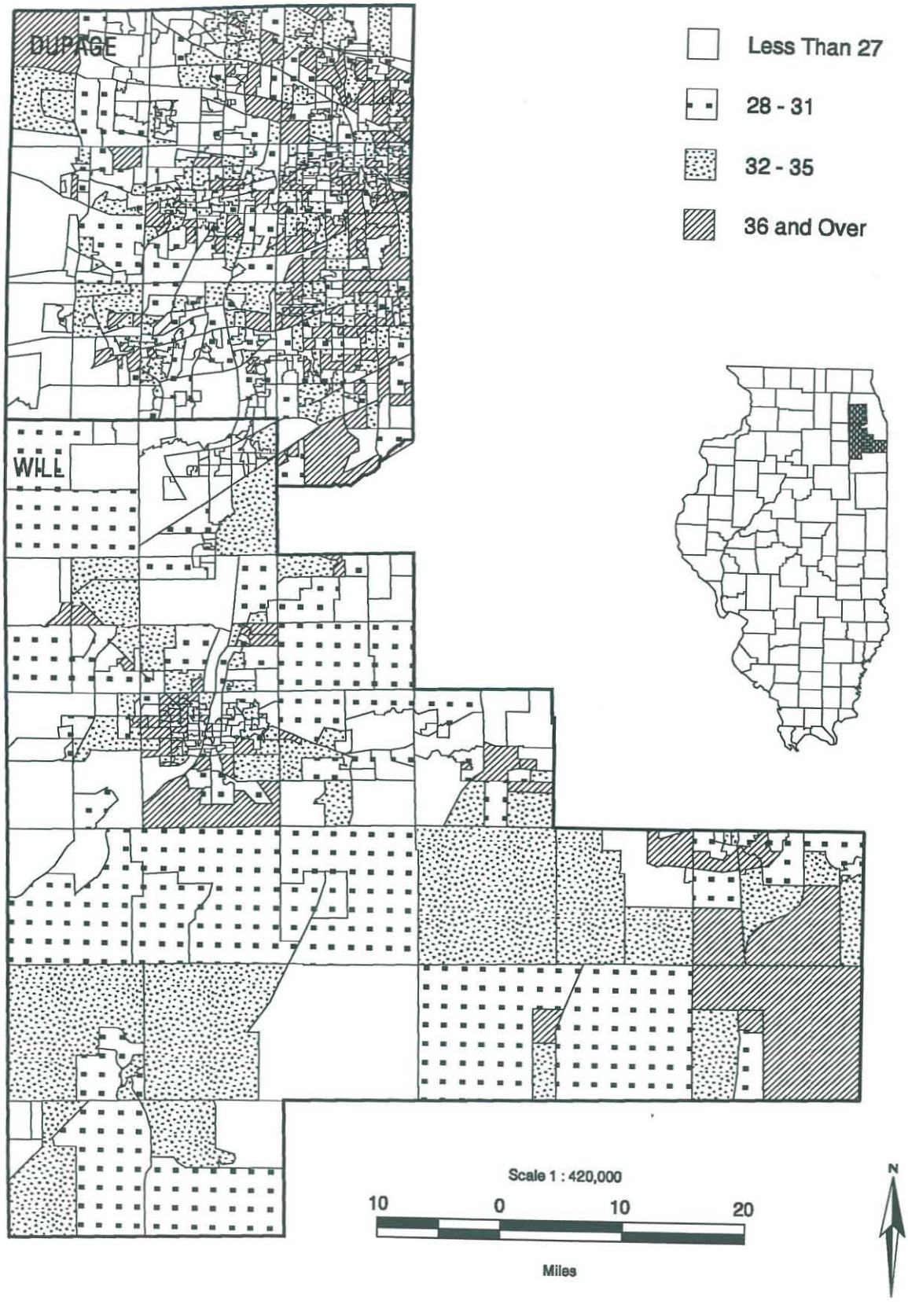


Figure 1-4. Age Distribution, Du Page River Area

Figure 1-5. Estimated Mean Age by 1990 Census Block Group



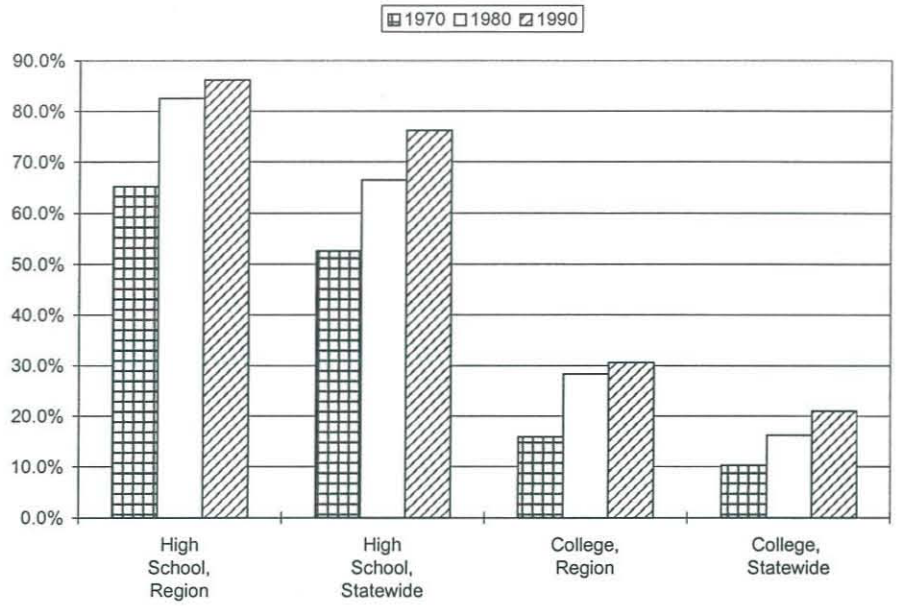


Figure 1-6. Education Trends

Education

Eighty-six percent of the area's residents aged 25 and older had completed high school in 1990, ten percent higher than statewide. More also finished college — 30.6% compared to 21%. Du Page County has the greatest number of college-educated residents, 36% compared to 18% in Will County.

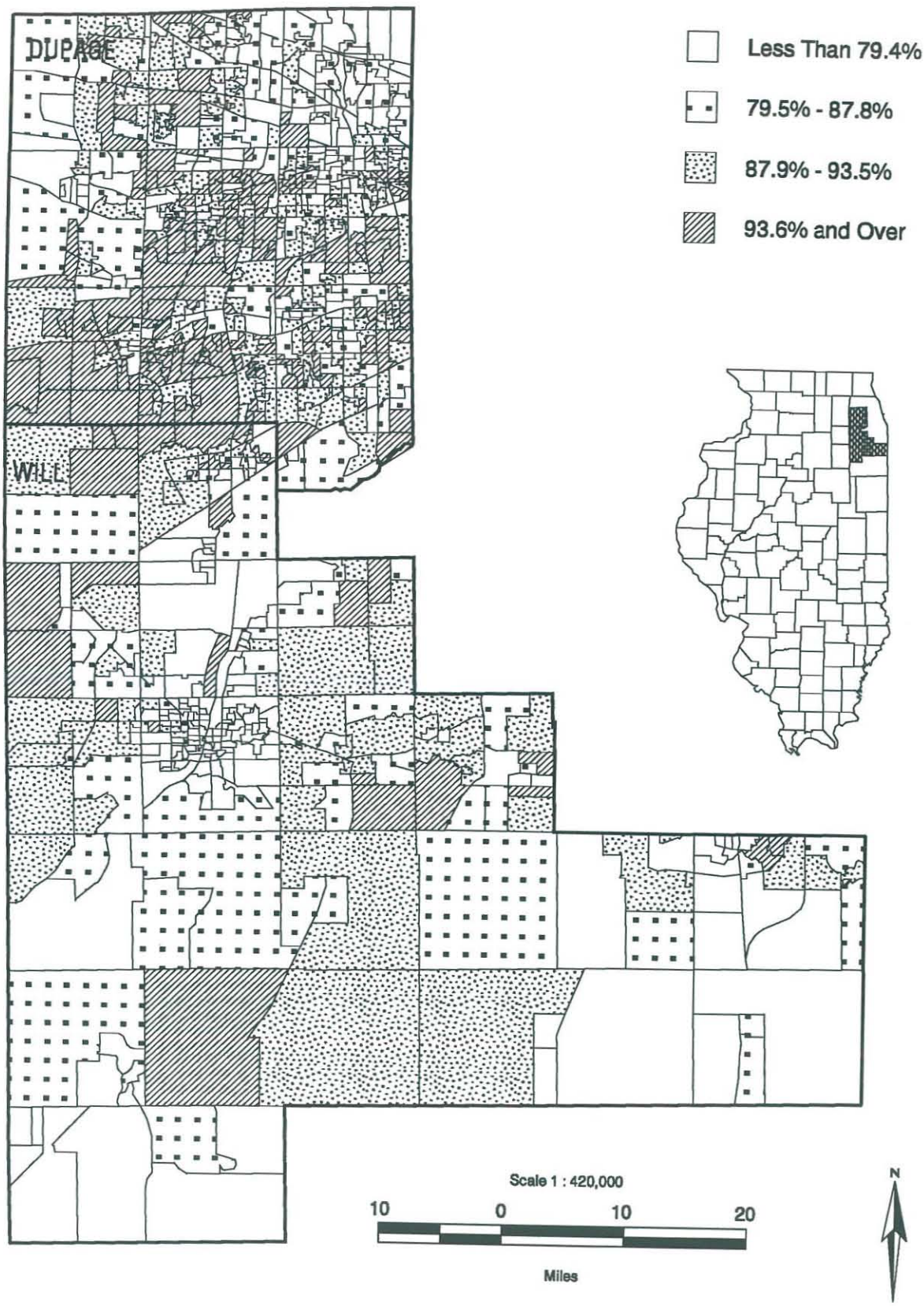
The census map in Figure 1-7 shows that the more educated populations live in Wheaton, Naperville and Woodridge in Du Page County, and in the areas east of Wilmington and west of Joliet, and the western portion of Bolingbrook in Will County. Those with the least education live in the West Chicago area and the northeastern part of Du Page County, and in the city of Joliet and the rural areas south of Wilmington in Will County.

Table 1-6. 1990 Educational Attainment
(persons age 25 and over)

	Not Completing High School	Completing High School Only	Completing Four or More Years of College
Will	19.6%	62.4%	18.0%
Du Page	11.4%	52.6%	36.0%
Region	13.9%	55.5%	30.6%
Illinois	23.8%	55.2%	21.0%

Figure 1-7. Educational Attainment by 1990 Census Block Group

Percentage of those over 25 who are high school graduates or higher.



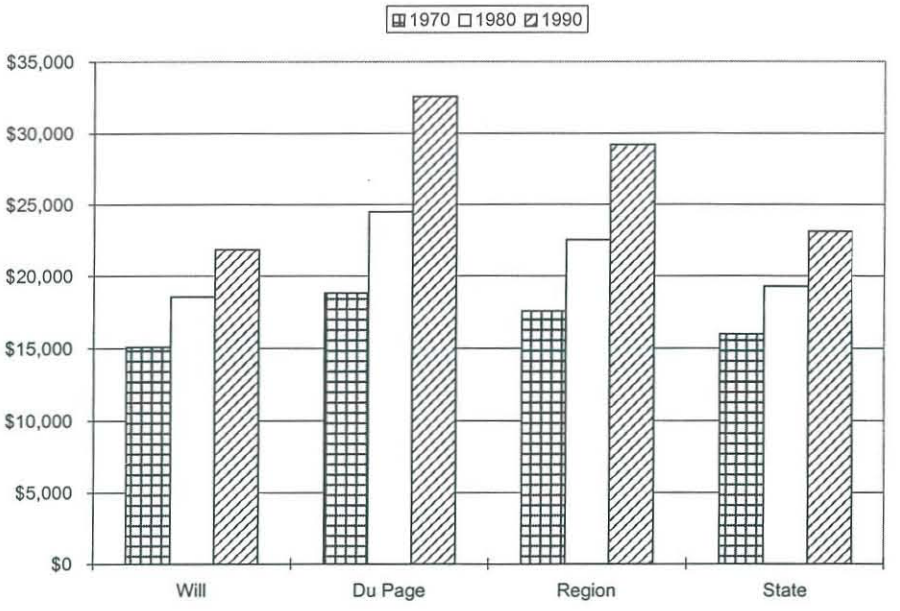


Figure 1-8. Per Capita Income

Per Capita Income

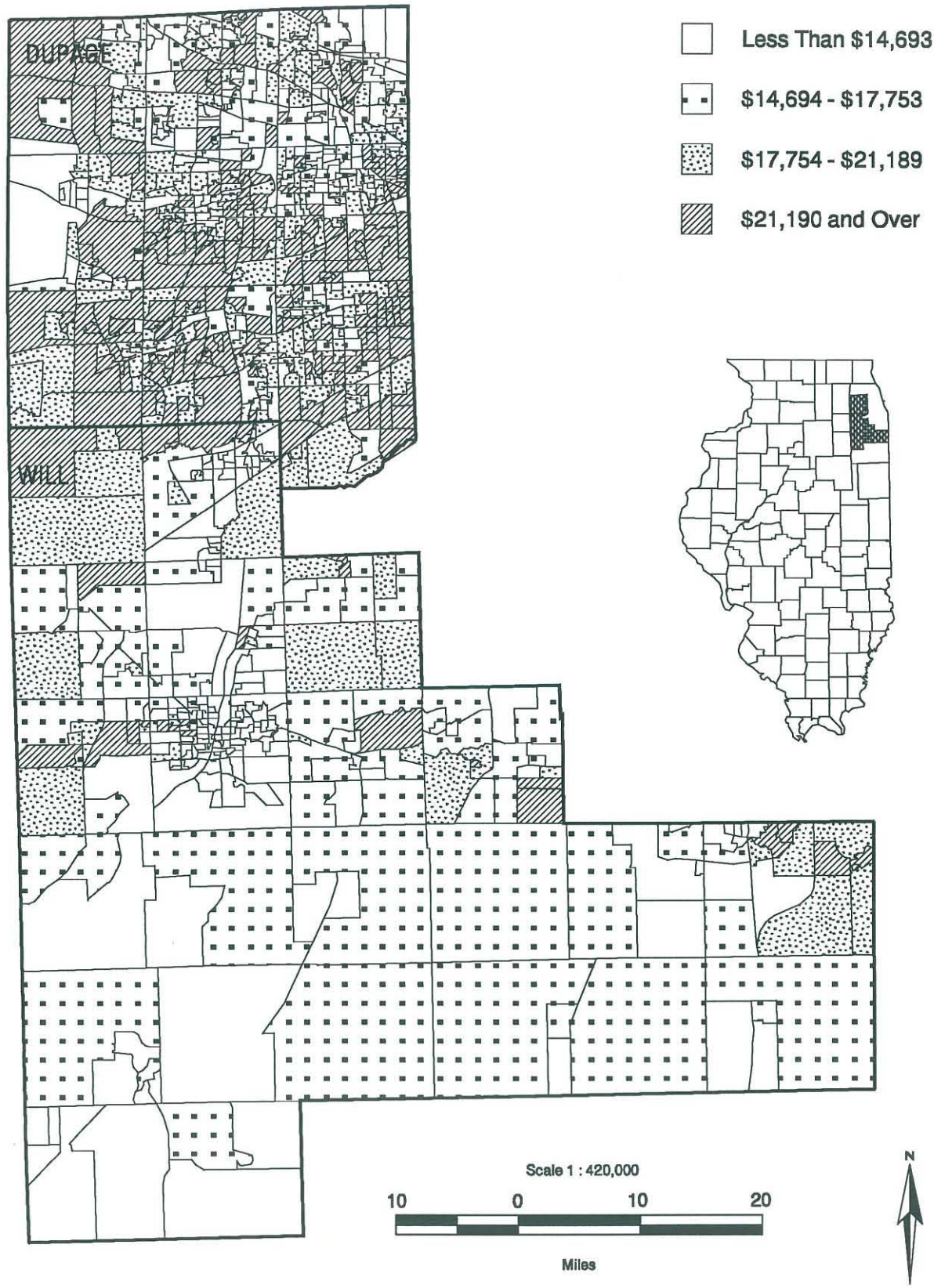
Per capita income is higher in the Du Page River area than it is statewide; in 1990, at $29,204, it was $6,068 higher.[6] From 1970-1990 per capita income rose 66% in the two-county area, with the greatest increase occurring in Du Page County. In 1990, Du Page County ranked 1st in the state in per capita income while Will County ranked 10th.

The map in Figure 1-9 shows that the areas with the highest per capita income in Will County are in Goodings Grove and the surrounding area, in the southern portion of New Lenox and the eastern portion of Steger, and on the west side of the county down to Wilmington. In Du Page County per capita income is highest in the northwestern corner of the county and in most of the southern half of the county, particularly around Wheaton, Naperville, Elmhurst and Downers Grove.

In 1990 the poverty rate in the Du Page River area was only 3.7% compared to 11.9% statewide (Figure 1-10). Between 1970 and 1990, the percentage of people living in poverty dropped 10% in Du Page County and 1.6% in Will County.[7]

[6] Per capita income data from *1998 State Profile.*
[7] Poverty data from 1970, 1980, and 1990 *Census.*

Figure 1-9. Per Capita Income by 1990 Census Block Group



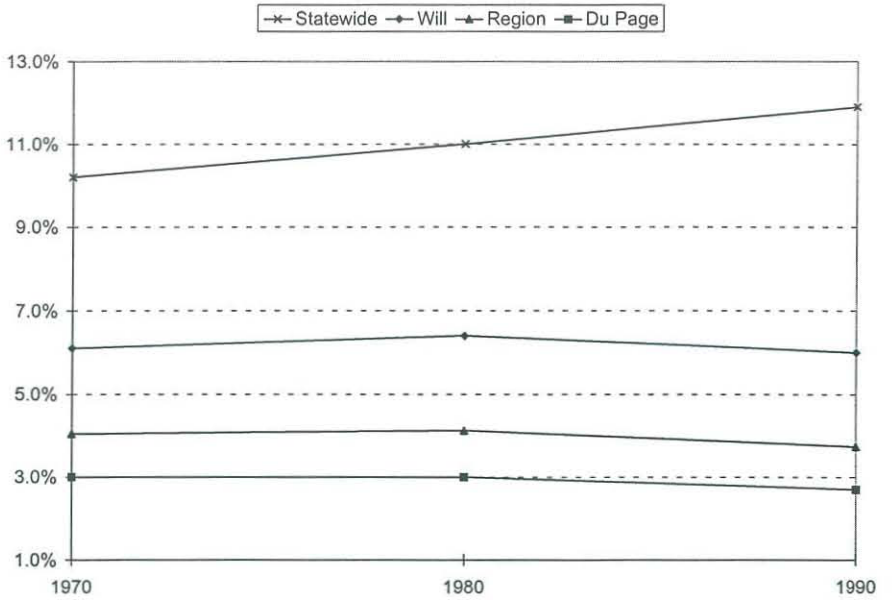


Figure 1-10. Percent of Population Living in Poverty

Race and Gender

The area has a moderately-sized minority population — 9% of the total population in 1990 — with the majority living in Will County. Statewide the minority population was 17.8%. Between 1970 and 1990 the number of minorities more than quadrupled, with the greatest increase in Du Page County, up 1,224%.

The ratio of men to women has been fairly equal in the area over the past 20 years, although the percentage of males dropped one-half of a percent between 1970 and 1990.

Households and Housing

Households

Between 1970 and 1990, while total population grew only 55%, the number of households in the two-county area increased 91%, compared to a 20% increase statewide. The number of persons per household dropped from 3.5 to 2.8 persons; statewide it dropped from 3.1 to 2.7 (Table 1-7).[8]

1990
Du Page River Area
Households: 397,140
Persons Per Household: 2.8
Median Household Income: $56,024

Housing Units: 415,407
Vacancy Rate: 4.6%
Median Value, Owner-occupied: $140,355

The greatest growth occurred in Du Page County, which added 189,600 households, up 105%. Will County added more than 46,000 new households, up 65% from 1970.

[8] Household data from *1997 State Profile.*

Table 1-7. Number of Households
(in thousands)

	1970	1980	1990
Will	71,070	103,260	117,190
Du Page	136,470	222,430	279,950
Region	207,540	325,690	397,140
Statewide	3,525,820	4,067,870	4,208,670

Table 1-8. Median Household Income
(in 1994 dollars)

	1979	1989	% change
Will	$45,650	$49,669	9%
Du Page	$53,832	$58,930	9%
Region	$51,132	$56,024	9%
Statewide	$37,811	$38,886	3%

Between 1979 and 1989 the median income of area households increased by more than 9% ($4,892) to $56,024 (1994 dollars), compared to statewide growth of almost 3% ($1,075).[9]

Housing

Between 1970 and 1990 area housing units increased by more than three-fifths while the percentage of vacant units grew slightly, from 4.3% to 4.9%. Statewide, units were up by almost one-fourth while vacancies rose from 5.4% to 6.7%. Will County experienced the greatest increase in housing units, up two-thirds while the number of vacant units doubled. In Du Page County, the number of units increased 43.3%, while the number of vacancies increased 31%.[10]

The median value of owner-occupied housing units (in 1994 dollars) increased 60%, from $87,966 in 1970 to $140,355 in 1990 (Figure 1-11).[11] Statewide, housing values rose 34%, to $92,849.

Table 1-9. Housing Units

	1970		1980		1990	
	Units	Vacancies	Units	Vacancies	Units	Vacancies
Will	73,711	4.1%	109,754	6.1%	122,870	4.8%
Du Page	142,422	4.3%	234,810	5.4%	292,537	4.5%
Region	216,133	4.3%	344,564	5.7%	415,407	4.6%
Illinois	3,703,367	5.4%	4,319,672	6.3%	4,506,275	6.7%

[9] Median household income data from 1980 and 1990 *Census*.
[10] Housing units and vacancies from 1990 and 1993 *Illinois Statistical Abstract*.
[11] Data on median value of housing from 1970, 1980 and 1990 *Census* and 1993 *Illinois Statistical Abstract*.

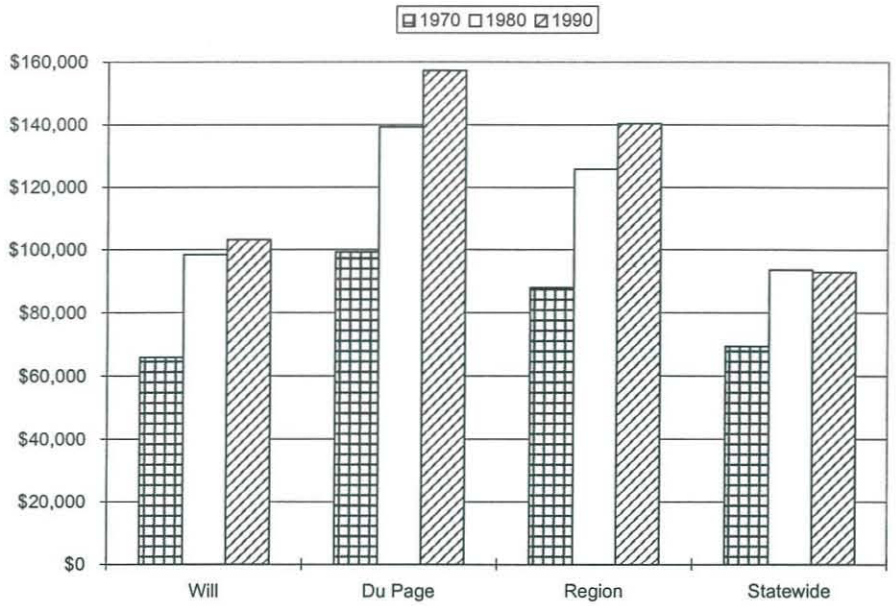


Figure 1-11. Median Value of Owner-Occupied Housing, in 1994 Dollars

Conclusion

The Du Page River area is one of the most highly urbanized areas in the state and in 1990 was home to 10% of the state's population. Ninety-six percent of area residents live in urban areas and 31% of the land is put to urban uses. Between 1870 and 1990 the population increased nineteenfold, with the largest growth occurring in Du Page County.

In 1990, 30% of the population was under the age of 19 and the median age was 32 years. Will County ranks first in the state for the percentage of young people and 101st for the percentage of elderly. Eighty-six percent of the population age 25 and older had completed high school, 10% higher than statewide, while 30.6% finished college compared to 21% statewide.

In 1990 per capita income was $29,204, 66% more than in 1970 and $6,068 higher than the statewide average. Median household income rose more than 9% between 1979 and 1989 (from $51,132 to $56,024). Between 1970 and 1990, the area poverty rate fell almost 8%, to 4% of the population, well below the statewide rate of 12%. During the 20-year period, the number of households grew by 90%, far higher than the 20% increase statewide. While growth occurred in both counties, it was greatest in Du Page, where the number of households doubled.

Health Trends

The most commonly used measure of a population's health is the mortality rate — the number of deaths per 100,000 people. Mortality rates are provided for total deaths and by cause of death. Other measures of health are infant mortality rates and premature births, the number of teenage and single mothers, and access to health care, measured by the number of hospital beds and doctors per 100,000 people. Health is typically influenced by the demographics and economics of the region, as well as by environmental quality.

Mortality Rates[1]

The mortality rate in the Du Page River area is about 33% below the state average,[2] and has been below the state average since at least 1960. The area mortality rate dropped 13% between 1960 and 1985, but increased 2% since then. Since 1960, the mortality rate has declined 11% statewide.

The lower mortality rate in the area compared to the state reflects in part the difference in demographic characteristics. For example, the elderly population has been shown to be

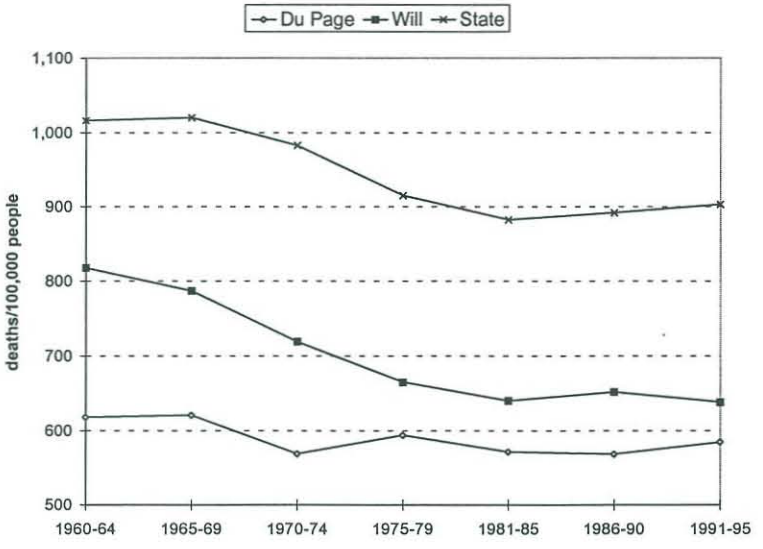


Figure 1-12. Total Mortality Rate

[1] Mortality rate data is from Illinois Department of Public Health: Division of Health Statistics, *Vital Statistics Illinois*, various years.

[2] In the discussion of the mortality rates, references to a mortality rate for a particular year is actually a five-year average rate. For example, when citing the 1960 mortality rate it is in fact the 1960-64 average mortality rate.

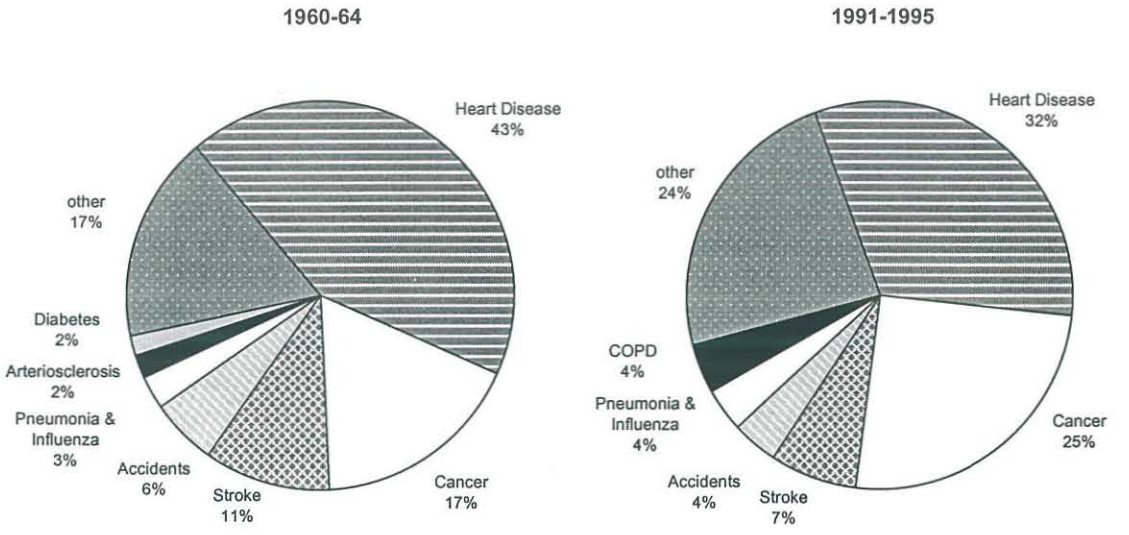


Figure 1-13. The Major Causes of Death in the Du Page River Area

positively correlated with mortality rates. The Du Page River area has a much lower elderly population (8.7%) than does the state as a whole (12.6%).

In 1995, the mortality rate in Will County was 9% higher than in Du Page County. Since 1960, the mortality rate has fallen 5% in Du Page County and 22% in Will County.

Major Causes of Death

The three major causes of death, in descending order, are heart disease, cancer, and stroke. During the 1991-1995 time period they accounted for more than 64% of all deaths statewide and 66% in the Du Page River area. Deaths from both heart disease and stroke have declined in the state and the area since 1960, while deaths from cancer have risen considerably.

Heart Disease

In 1995 the mortality rate from heart disease was 36% lower in the Du Page River area than statewide, 194 deaths per 100,000 compared to 302.

Since 1960 the area heart disease mortality rate has declined at a slightly faster pace than the state rate — 34% compared to 32%. Within the area, the rate has declined the most in Will County (40%).

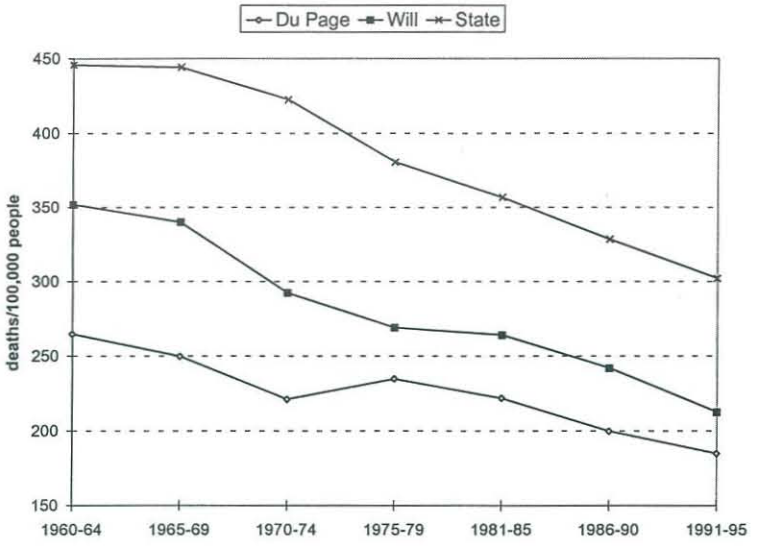


Figure 1-14. Heart Disease Mortality

Cancer

The area cancer mortality rate has been below the state rate since 1960; in 1995 it was 153 deaths per 100,000 population, 28% lower than the state rate.

The cancer mortality rate has increased at about the same pace in the area and statewide — up 28% and 27% respectively. The largest increase was in Du Page County, up 33%.

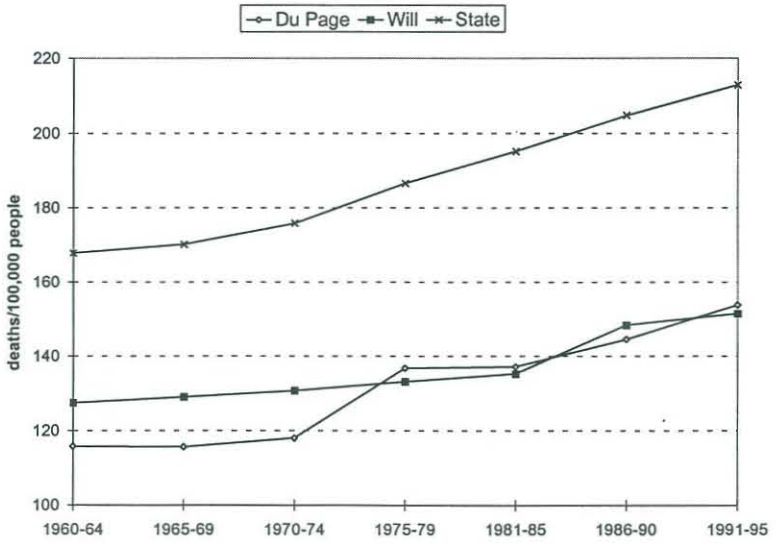


Figure 1-15. Cancer Mortality

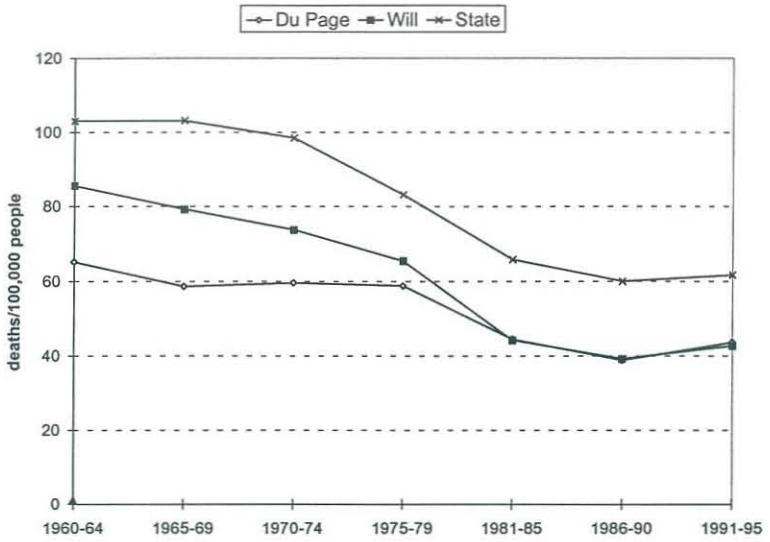


Figure 1-16. Stroke Mortality

Stroke

Stroke mortality has dropped dramatically since 1960 — 40% in the Du Page River area and statewide. In 1995, the death rate from stroke was 31% lower in the area than in the state.

Infant Mortality and Premature Births

Another measure of community health is the infant mortality rate, which has typically been lower in the Du Page River area than it has statewide. In 1995, there were almost seven deaths per 1,000 live births in the area (about 30% below the state average).

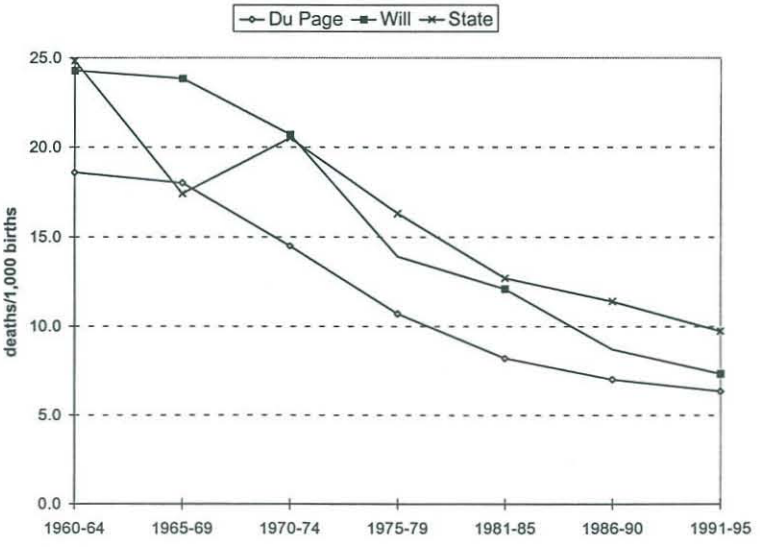


Figure 1-17. Infant Mortality

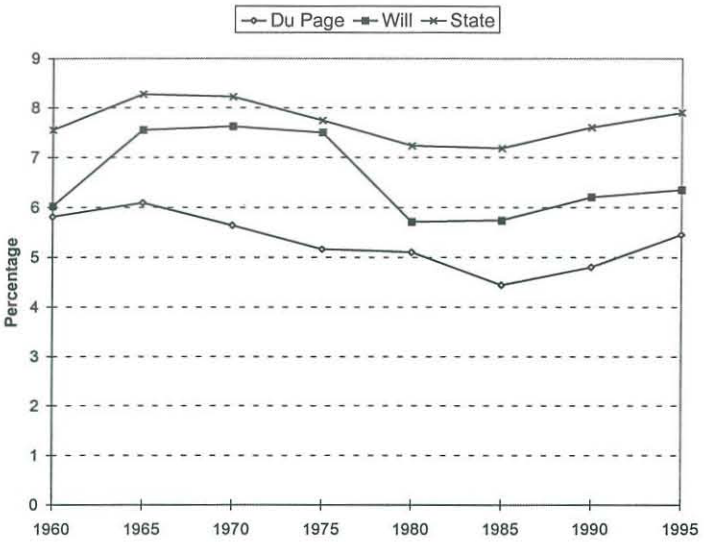


Figure 1-18. Premature Births as a Percentage of Total Births

Infant mortality has been declining at a steady rate since 1960, down 60% statewide and 68% in the area. [3]

The Du Page River area also has a lower percentage of premature births; in 1995 it was 28% lower than statewide.[4]

Teenage and Single Mothers[5]

The rates of infant mortality and premature births are influenced by the number of teenage and single mothers who often have less income and, therefore, less access to health care. Between 1975 and 1995 the teen birth rate declined both 30% statewide and 45% in the area (Figure 1-19). The area's teen birth rate has been significantly below the state average; in 1995 it was 60% lower. The teen birth rate in Will County, however, is more than double the rate in Du Page County.

While the teen birth rate declined over the 20-year period, the percentage of births to single mothers jumped 98% statewide and 280% in the Du Page River area (Figure 1-20). Since 1975, the area rate has been significantly below the state rate; in 1995 it was 59% lower.

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[3] This data is from Illinois Department of Public Health: Division of Health Statistics, *Vital Statistics Illinois*, various years.

[4] From 1960-85, the Illinois Department of Public Health defined premature births (in the *Vital Statistics of Illinois*) as babies born at a weight less than 2501 grams. In 1990, the *Vital Statistics Report* included the number of babies at less than 2599 grams.

[5] This data is from Illinois Department of Public Health: Division of Health Statistics, *Vital Statistics Illinois*, various years.

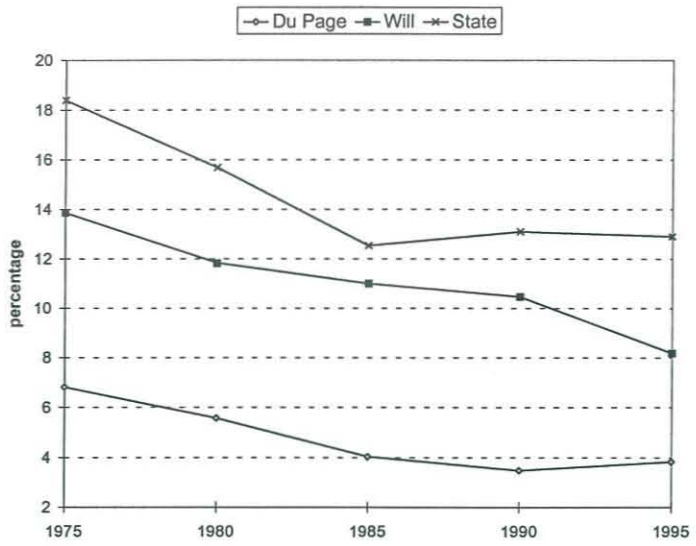


Figure 1-19. Percentage of Births to Teenage Mothers

Health Care Access

A key aspect of health is the availability of health care providers and facilities, specifically the number of doctors and staffed hospital beds. In 1995 the Du Page River area had 52% fewer hospital beds and 19% more doctors per 1,000 people than the state average. Within the area, Du Page County has more hospital beds and doctors.

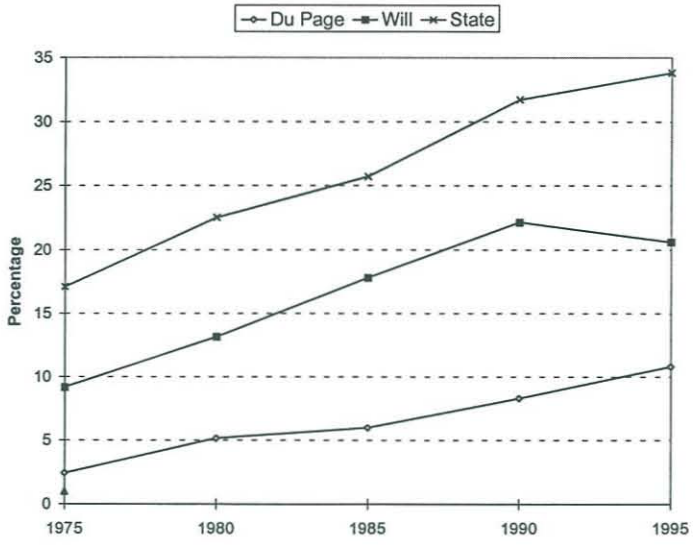


Figure 1-20. Percentage of Births to Single Mothers

Table 1-10. Hospitals in the Du Page River Region (1994)

	City	Staffed Beds
Alcoholism Treatment Center	Winfield	52
Central Du Page Hospital	Winfield	317
Edward Hospital	Naperville	159
Elmhurst Memorial Hospital	Elmhurst	308
Glenoaks Hospital & Medical Center	Glendale Heights	115
Good Samaritan Hospital	Downers Grove	307
Hinsdale Hospital	Hinsdale	417
Linden Oaks Hospital	Naperville	92
Marianjoy Rehab Hospital & Clinics	Wheaton	107
Saint Joseph Medical Center	Joliet	500
Silver Cross Hospital	Joliet	231

In both the Du Page River area and statewide, trends in health care availability have been toward more doctors and fewer hospital beds. Table 1-11 shows that since 1975 the number of staffed hospital beds has declined 30% statewide while the number of doctors has increased about 43%. In the Du Page River area there are 22% fewer hospital beds and 105% more doctors since 1975.

Table 1-11. Number of Staffed Hospital Beds and Doctors Per 1,000 People[6]

	1975	1980	1985	1990	1995
Hospital Beds					
Du Page	2.4	2.8	2.7	2.5	2.2
Will	3.2	3.0	2.8	2.1	1.8
Region	2.7	2.9	2.7	2.4	2.1
State	6.3	6.3	5.8	5.1	4.4
Doctors					
Du Page	1.60	1.98	2.58	3.11	3.43
Will	0.76	0.79	1.01	1.07	1.13
Region	1.31	1.59	2.08	2.47	2.69
State	1.60	1.72	2.05	2.25	2.27

Conclusion

The total mortality rate has declined in Illinois and in the Du Page River area. Infant mortality and mortality rates for heart disease and stroke have declined in both the area and the state, while cancer mortality has increased significantly. The area mortality rate has been significantly below the state average since 1960; in 1995 it was 33% lower.

[6] Data on number of hospital beds is from the Illinois Hospital & Health Systems Association.

The percentage of births to teenage mothers declined in both the Du Page River area and the state, while the percentage of births to single mothers rose significantly. However, area births to teenage mothers and single mothers are much lower than the state rate. With respect to health care availability, the area is below the state average in staffed hospital beds per 100,000 people and above the state average in number of doctors per 100,000 people.

The Regional Economy

In 1995, the Du Page River area (Du Page and Will counties), had about 800,000 people employed with $39.1 billion total personal income.[1] Du Page County, the larger of the two counties, accounted for about 80% of employment and 84% of income.

During the period 1970-1995, area employment grew much faster than Illinois' — 4.9% average annual growth compared to 1.2% statewide. Du Page County experienced especially strong employment growth, 5.9%, compared to Will County, 2.3%.

In Will County, total personal income grew faster than employment, while in Du Page County employment made extremely favorable gains. In Will County personal income grew 3.6% annually; in Du Page County, 4.8%, while statewide, personal income grew 1.8% annually.

Figure 1-22 shows that the population is diverse in terms of employment in most of Du Page County and in the Joliet area of Will County. Clustered in small areas in much of Will County and in northern Du Page County are residents who work for manufacturing and the combined sectors of government, construction, transportation, and public utilities (identified as 'other'). In southeast Will County, agriculture is a significant source of employment for residents.

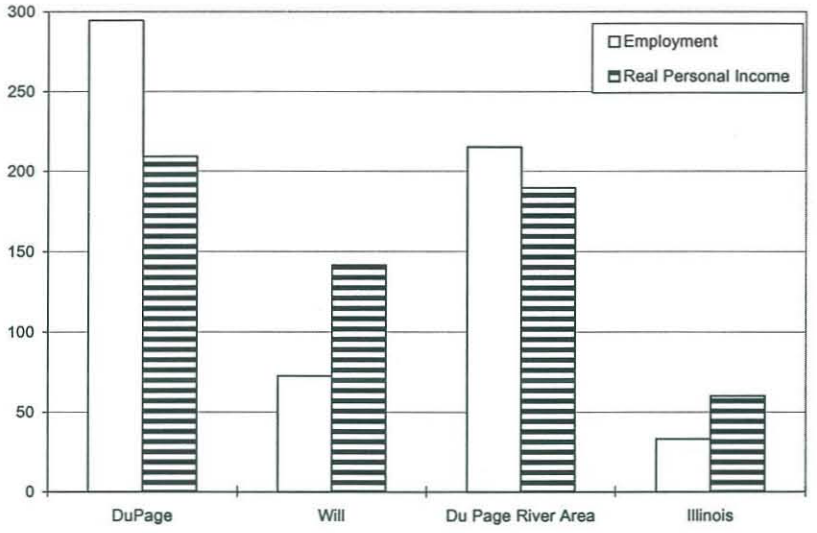
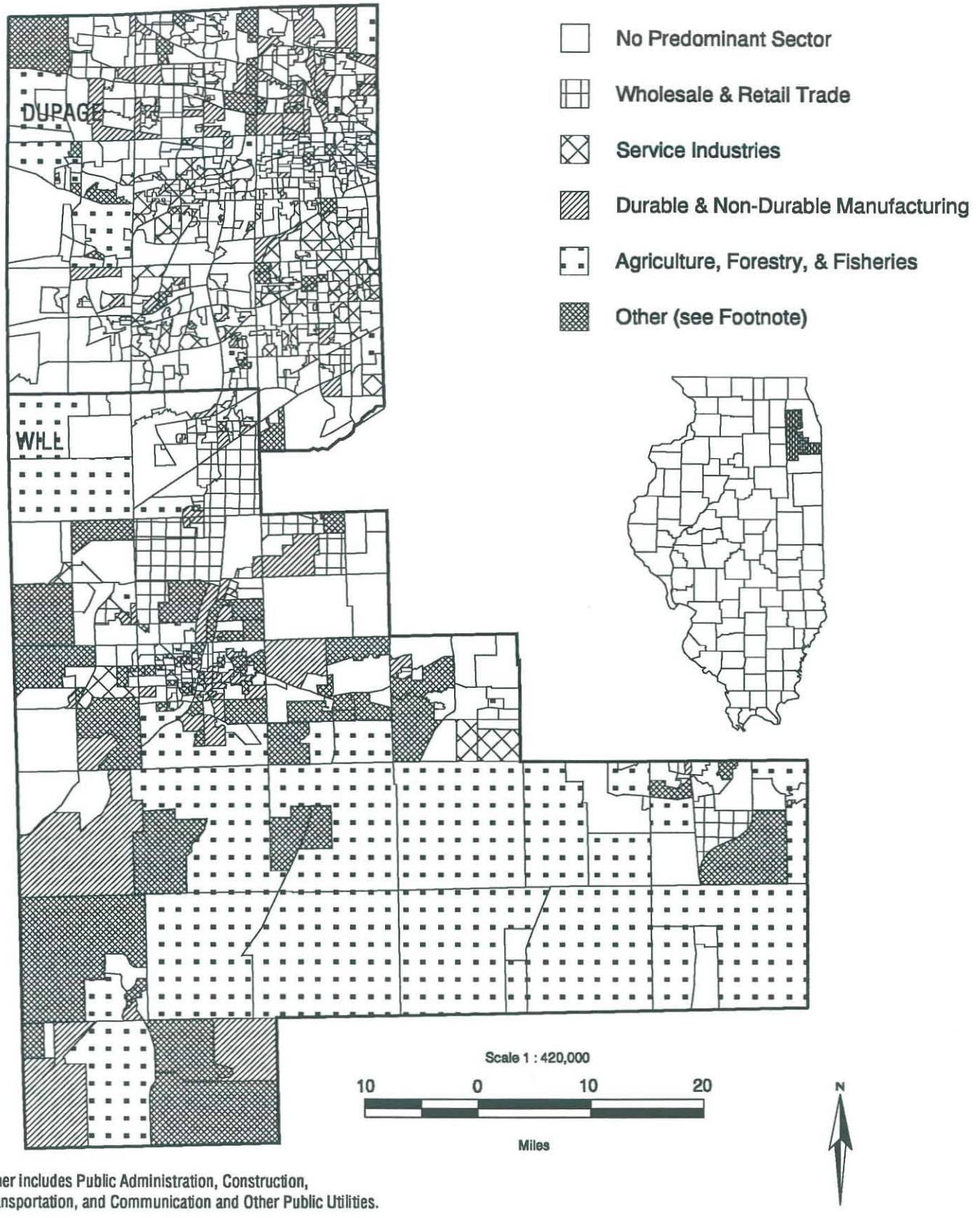


Figure 1-21. Percent Change in Employment and Personal Income, 1970-1995

[1] Income and earnings discussed in this chapter are reported in 1995 dollars. Total personal income includes the earnings (wages and salaries, other labor income, and proprietor's income); dividends, interest, and rent; and transfer payments received by the residents of the area.
Source: Regional Economic Information System, 1969-1995, U.S. Department of Commerce, Bureau of Economic Analysis.

Figure 1-22. Significant Employment Sectors by 1990 Census Block Group

Significant is defined as greater than one standard deviation above the mean percentage for the 2-county area.



Other includes Public Administration, Construction, Transportation, and Communication and Other Public Utilities.

Table 1-12. 1995 Employment and Personal Income

	Employment	% of Illinois Employment	Income (million $)	% of Illinois Income
Du Page	627,033	9.4	29,965.4	10.0
Will	152,672	2.3	9,446.8	3.2
Region	779,705	11.7	39,100.3	13.1
Illinois	6,648,279	100	298,211.1	100

Table 1-13 shows that both Du Page and Will counties had a positive residential adjustment to personal income, indicating that more workers commute to neighboring counties than commute from them.[2]

Table 1-13. Composition of Total Personal Income (1995)
(in millions)

	Du Page	Will	Region	Illinois
Earnings	22,603.8	4,289.9	26,893.7	215,671.5
less contributions	1,494.1	292.0	1,786.1	14,592.1
plus residence adjust.	1,302.8	3,180.5	4,483.3	-525.9
Adjusted Earnings	22,412.5	7,178.4	29,590.9	200,553.5
Div., Int., & Rent	4,956.8	1,243.0	6,199.8	54,051.1
Transfer Payments	2,284.2	1,025.4	3,309.6	43,606.6
Total Personal Income	29,653.5	9,446.8	39,1003	298,211.1

Structural Change in the Economy

Since the early 1970s, the economy of the Du Page River area, as in Illinois and the U.S., has changed steadily from a manufacturing base to a more service-related economy, e.g., business, health, educational services, and wholesale/retail trade.

In 1970 manufacturing led the area in earnings, even though it was second in employment after wholesale/retail (Figure 1-25 and 1-26). By 1981 services led in earnings. Over the 25 years between 1970 and 1995 manufacturing fell from 27% to 16% of area earnings. However, manufacturing continues to be a steadily growing sector, primarily in Du Page County.

[2] Adjustments are made in earnings to transfer 'place-of-work' income to 'place-of-residence' income. A negative adjustment means that more people commute to the county for work; a positive adjustment means that more people commute out of the county.

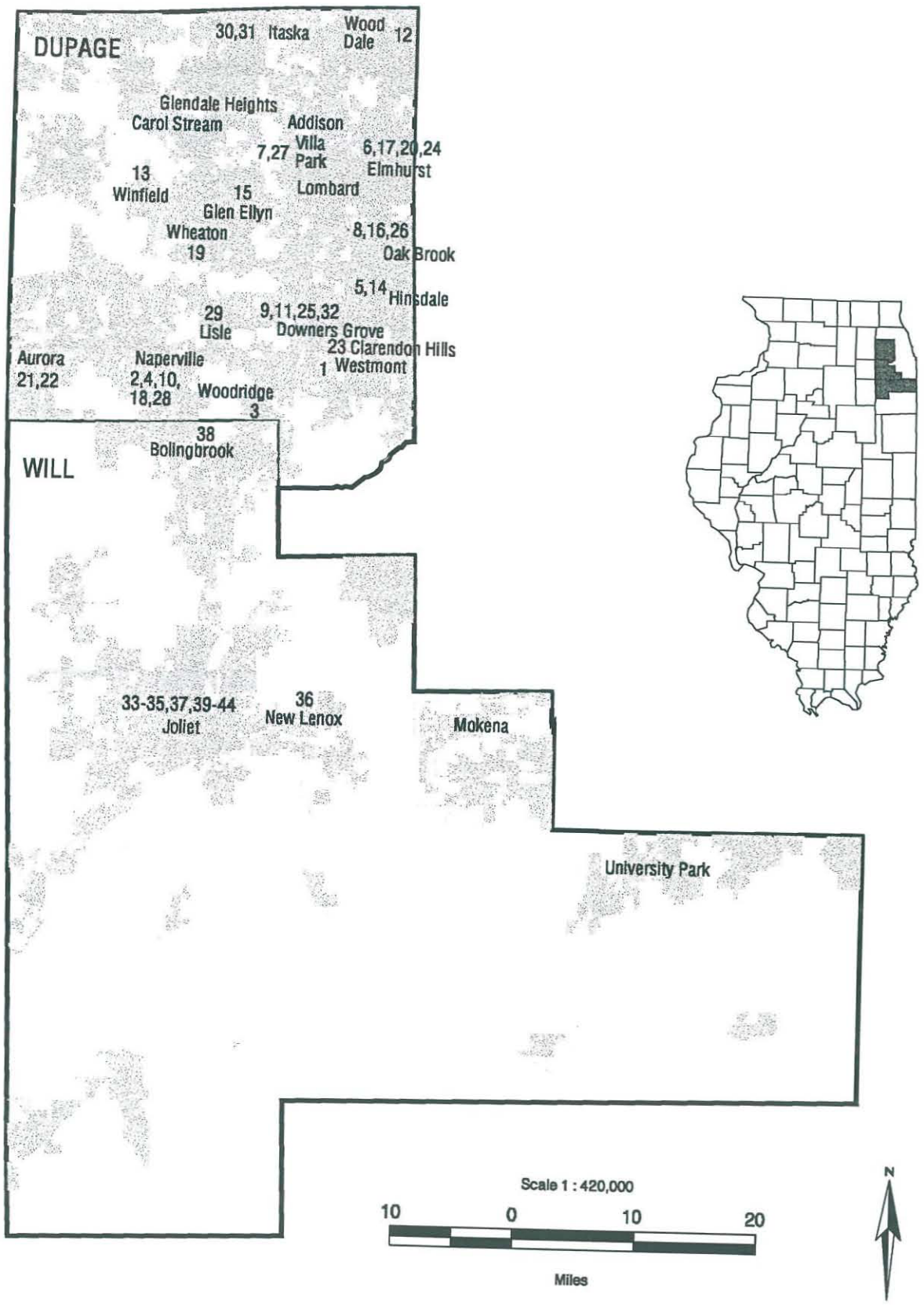
Table 1-14. Major Employers, Du Page River Area

Company	City	Map Legend	Business Classification	SIC	Employees
Du Page County					
Employco Inc.	Westmont	1	Human Resource Consulting	874	5,000
Lucent Technologies	Naperville	2	Design Services	738	4,000
University of Chicago	Woodridge	3	Natural Resource Research	873	3,000
Stanley Smith Security	Naperville	4	Business Services, NEC	738	2,500
Adventist Health System	Hinsdale	5	Medical Center	801	2,470
Elmhurst Memorial Hospital	Elmhurst	6	Medical & Surgical Hospital	806	2,429
Platinum Technology International	Villa Park	7	Prepackaged Software	737	2,000
Central Leasing Management	Oak Brook	8	Labor Resource Services	736	2,000
Advocate Health Care	Downers Grove	9	Medical & Surgical Hospital	806	2,000
Edward Hospital	Naperville	10	Medical & Surgical Hospital	806	1,972
Illinois Tollway Authority	Downers Grove	11	Regulating Agencies	962	1,900
Household Credit Services	Wood Dale	12	Financial Services	738	1,700
Central Du Page Hospital	Winfield	13	Medical & Surgical Hospital	806	1,627
McDonald's Corp.	Hinsdale	14	Fast Food Restaurants & Stands	581	1,500
Community College #502	Glen Ellyn	15	Junior College	822	1,369
McDonald's Restaurants	Oak Brook	16	Fast Food Restaurants & Stands	581	1,200
Compass Group	Elmhurst	17	Food Vending Machines	596	1,200
British Petroleum /Amoco	Naperville	18	Commercial Physical Research	873	1,050
Wfsi-Illinois	Wheaton	19	Medical & Surgical Hospital	806	1,024
Household Finance Corp.	Elmhurst	20	Federal Savings Institution	603	1,000
Metropolitan Life Insurance	Aurora	21	Insurance Adjusters	641	950
Copley Memorial Hospital	Aurora	22	Medical & Surgical Hospital	806	920
Mid America Federal Savings	Clarendon Hills	23	Data Processing & Preparation	737	900
Media One	Elmhurst	24	Cable & Other Pay Television	484	850
John M. Smyth	Downers Grove	25	Furniture Stores, NEC	571	850
Ace Hardware	Oak Brook	26	Varnishes	519	840
Imperial Service Systems	Villa Park	27	Building & Office Cleaning Services	734	800
Nicor Inc.	Naperville	28	Natural Gas Distribution	492	800
Molex Corporation	Lisle	29	Electronic Connectors	367	800
Boise Cascade	Itasca	30	General Warehousing & Storage	422	800
Enesco Corp.	Itasca	31	Gift, Novelty, & Souvenir Shop	594	800
Servicemaster	Downers Grove	32	Management Services, NEC	874	770
Will County					
Provena Hospital	Joliet	33	Medical & Surgical Hospital	806	2,300
Caterpillar, Inc.	Joliet	34	Crushers, Grinders	353	2,000
Empress Casino	Joliet	35	Gambling & Lottery Services	799	2,000
Panduit Corporation	New Lenox	36	Electric Connectors	364	2,000
Silver Cross Hospital	Joliet	37	Medical & Surgical Hospital	806	1,400
Tellabs Operations	Bolingbrook	38	Telegraph Apparatus	366	1,300
Elgin, Joliet, & Eastern Railway	Joliet	39	Switching & Terminal Services	401	1,100
Harrahs Entertainment	Joliet	40	Hotels	701	1,050
Ill. Dept. of Corrections	Joliet	41	Correctional Institutions	922	1,000
Joliet Junior College	Joliet	42	Junior Colleges	822	814
Will County-Jefferson Street	Joliet	43	Executive Offices	911	700
Commonwealth Edison	Joliet	44	Electric Services	491	650

Note: NEC means "not elsewhere classified"

Source: Dun and Bradstreet, Dun's Direct Access Business Database, New York, 1995

Figure 1-23. Major Employers in the DuPage River Area



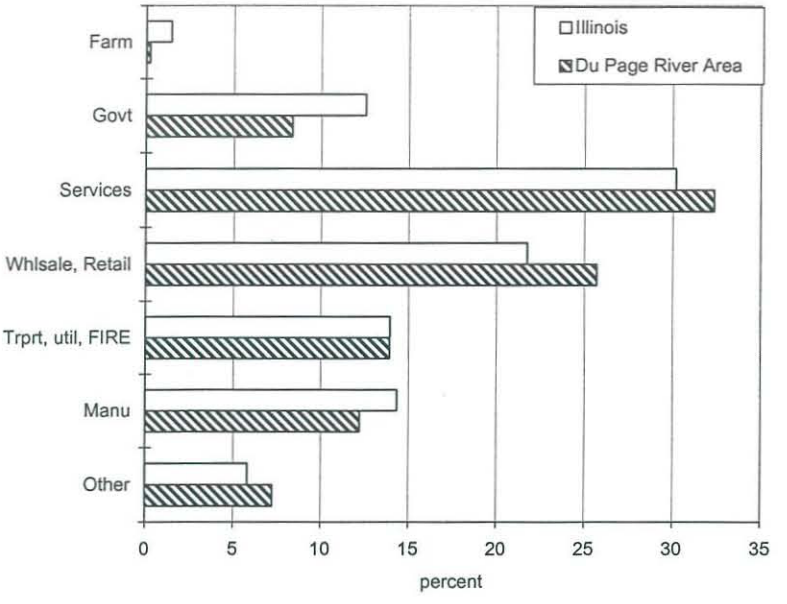


Figure 1-24. State and Area Employment Distribution, 1995

Service sector employment grew by more than three-fourths to more than 252,000 workers and earnings doubled to $8,997 million. Services and the wholesale/retail sector constitute more than one-half of area employment and earnings.

With the exception of farming, the remaining sectors also grew in employment and earnings.

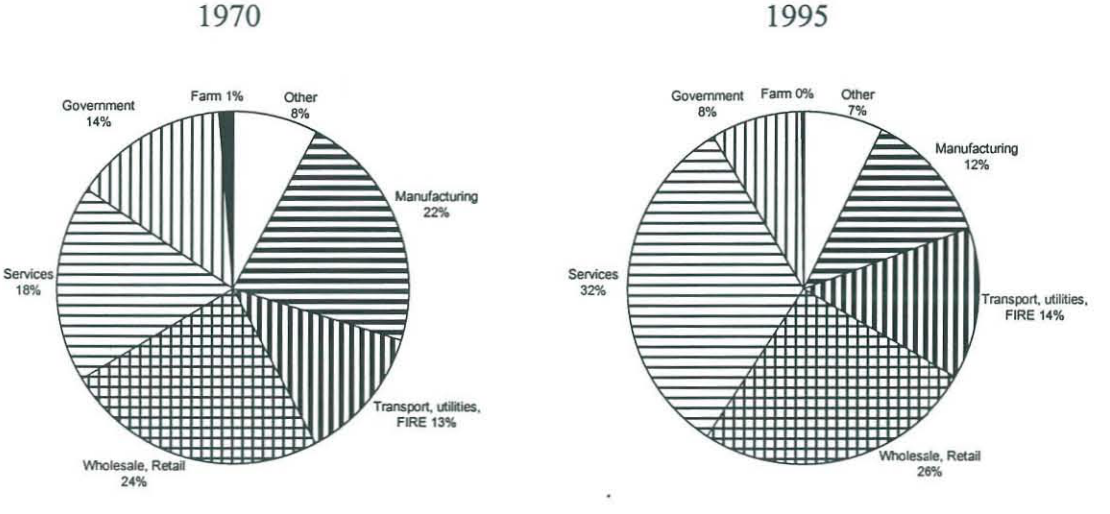


Figure 1-25. Employment Distribution in the Du Page River Area, 1970 and 1995.

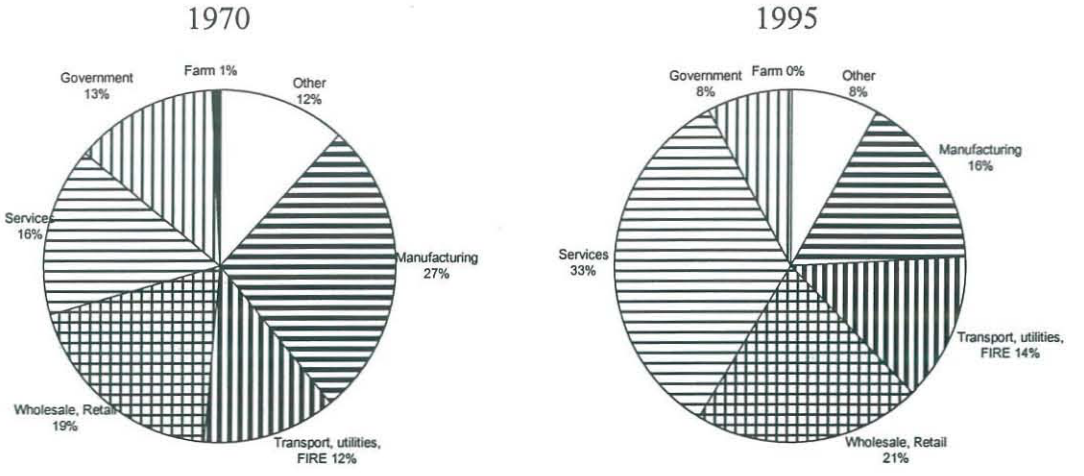


Figure 1-26. Earnings Distribution in the Du Page River Area, 1970 and 1995.

Economic Characteristics by County

Economic activity in the Du Page River area has been centered in services, manufacturing, and wholesale/retail trade. In Will County most of the large establishments are located in Joliet, the county's largest city. In Du Page County the larger business establishments are spread out among numerous cities.

Du Page County

Unlike most counties, Du Page County experienced growth in all economic sectors except farming, where employment fell 65%. Over the 25-year period, county employment grew 5.9% annually compared to a statewide increase of 1.1%, and earnings increased 7.2% annually, compared to the state average of 1.8%.

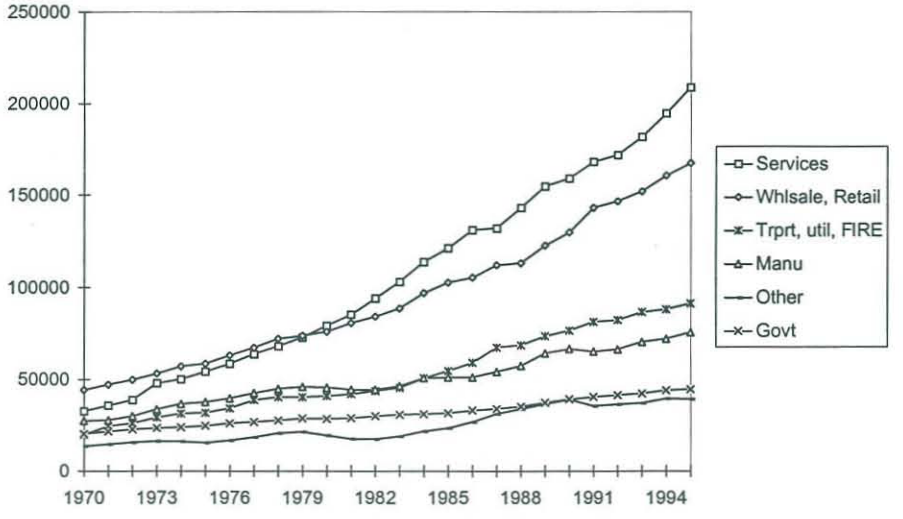


Figure 1-27. Du Page County Employment, by Sector

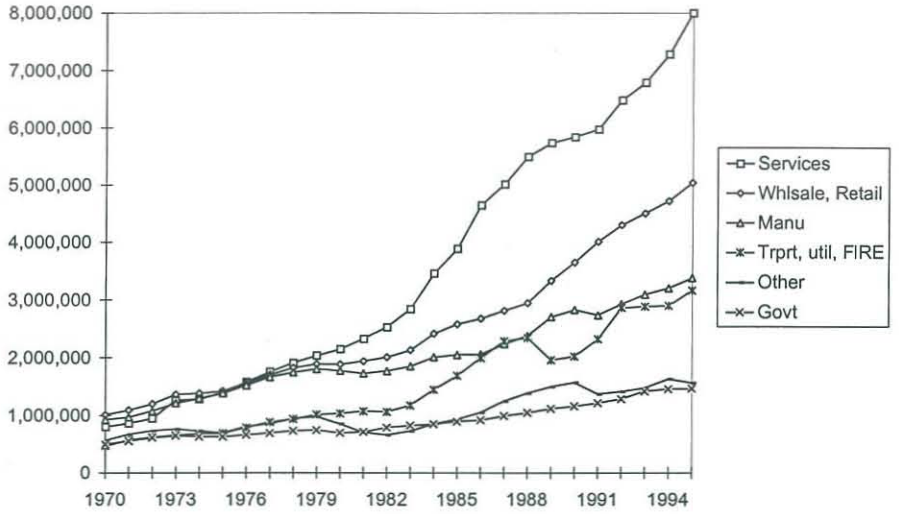


Figure 1-28. Du Page County Earnings, by Sector

The service sector experienced more than 8% annual increases in employment and 10% in earnings. In 1995, services represented more than one-third of the total workforce and about $8 billion in earnings. The ten largest establishments in Du Page County are classified under the service category, with a personnel consultant, Employco, leading the group with 5,000 employees.

While the service and wholesale/retail sectors made impressive gains, manufacturing employment and earnings also grew, contrary to the statewide trend. The largest manufacturing employer is Molex Corporation, a producer of electronic components, which employs 800 people.

Transport, utilities, and FIRE employment grew at a healthy rate of 6.6% annually, while earnings grew even faster at 8.3% annually. Household Finance and Metropolitan Life are the two largest employers in this sector.

Table 1-15. Du Page County Employment & Earnings

	1995 Employment	% Change 1970-95	Average Annual Change	% of Workforce	1995 Earnings (million $)	% Change 1970-94	Average Annual Change	% of Total Earnings
Manufacturing	75,569	175.9	4.3%	12.1	3,376.1	265.9	5.6%	14.9
Transportation, Utilities, FIRE	91,256	361.4	6.6%	14.6	3,161.0	582.3	8.3%	14.0
Wholesale, Retail	167,326	277.8	5.7%	26.7	5,035.6	400.3	6.9%	22.3
Services	208,787	538.6	8.0%	33.3	7,997.5	902.5	10.1%	35.4
Government	44,539	119.1	3.3%	7.1	1,461.2	196.1	4.6%	6.5
Farming	319	-65.2	-4.3%	0.1	13.7	-50.3	-2.9%	0.1
Other	39,237	190.4	4.5%	6.3	1,558.7	177.5	4.3%	6.9
TOTAL	627,033	294.6	5.9%	100.0	22,603.8	429.0	7.2%	100..0

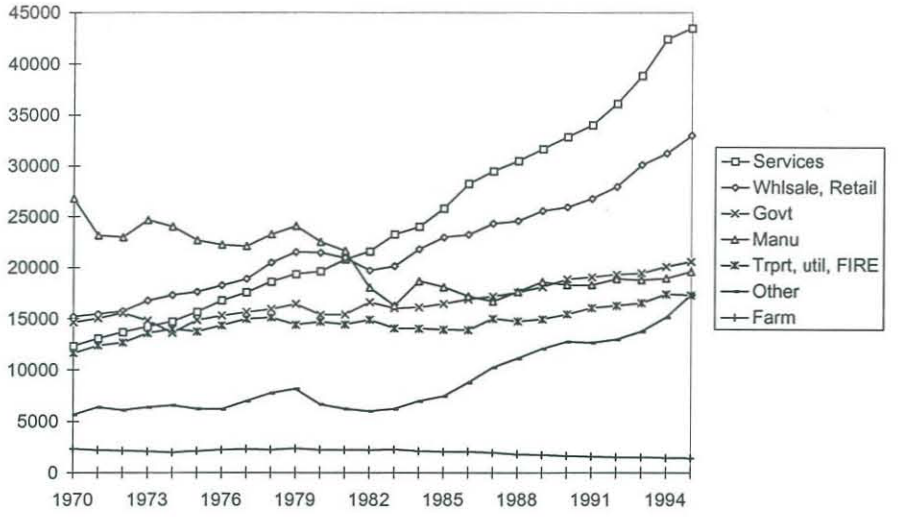


Figure 1-29. Will County Employment, by Sector

Will County

Will County also experienced strong growth over the 24-year period. Employment and earnings increased 2.3% and 2.1%, above the statewide rates of 1.1% and 1.8%. Only manufacturing and farming experienced losses.

Manufacturing employment fell by more than one-fourth and earnings dropped by almost 5% over the period, making the sector fourth in employment and second in earnings. Nevertheless, Caterpillar, Panduit (electrical conductors), and Tellabs (telegraphs) are still among the largest employers in Will County.

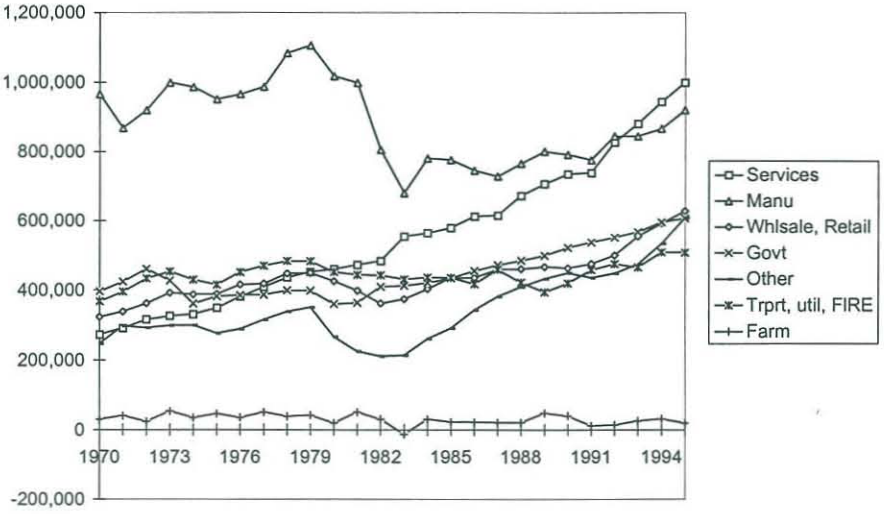


Figure 1-30. Will County Earnings, by Sector

Table 1-16. Will County Employment & Earnings

	1995 Employment	% Change 1970-94	Average Annual Change	% of Workforce	1995 Earnings (million $)	% Change 1970-94	Average Annual Change	% of Total Earnings
Manufacturing	19,607	-26.8	-1.3	12.8	919.8	-4.7	-0.2	21.4
Transportation, Utilities, FIRE	17,284	48.8	1.7	11.3	507.8	38.2	1.4	11.8
Wholesale, Retail	32,984	117.3	3.3	21.6	627.9	94.2	2.8	14.6
Services	43,484	252.5	5.4	28.5	999.5	265.9	5.6	23.3
Government	20,575	40.7	1.4	13.5	606.8	53.2	1.8	14.1
Farming	1,421	-38.8	-2.0	0.9	19.5	-36.4	-1.9	0.5
Other	17,317	206.2	4.8	11.3	608.6	146.0	3.8	14.2
TOTAL	152,672	72.5	2.3%	100.0	4,289.9	64.8	2.1%	100.0

The service sector experienced impressive gains, over 5% annually in both employment and earnings. In 1995, services represented more than 28% of the workforce and 23% of county earnings. Provena Hospital, with 2,300 employees, is the largest service sector entity, followed by the Empress Casino, and Silver Cross Hospital.

Conclusion

Relative to statewide growth, this area grew at exceptional rates over the period. Employment grew at a 4.9% annual average or 215% over the 25-year period. In 1995, the Du Page River area had 779,705 employees with $39.1 billion in personal income, accounting for 11.4% of Illinois' workforce and 13.1% of its income.

The area economy is dominated by Du Page County, which accounts for more than 80% of employment and earnings. Growth in both Du Page and Will counties' employment and earnings was above the state rate during the 25-year period.

The service sector made great gains and is now the largest sector in both counties. The manufacturing sector continued to grow in Du Page County but declined in Will County.

Agriculture

Illinois possesses some of the richest agricultural resources in the world and agriculture continues to be a key component of the state's economy and character. Since Illinois' agriculture occupies a large percent of the land cover in the state, trends and information about agriculture production, cash receipts from livestock and crops, and progress in meeting soil conservation goals helps in understanding the region's overall identity.

Agricultural Lands

A little more than half of the land in the Du Page River area is used for agriculture compared to almost three-fourths statewide. Crops are grown on two-thirds of the agricultural lands.[1] Of the two counties, Will has by far more acreage in agricultural land — Du Page ranks 101st in the state in the amount of land dedicated to agriculture. More than one-fifth of Will County is rural grassland, making it 7th in the state in rural grassland acreage.

Between 1978 and 1992, the number of farms in the region declined 29%, more than the statewide decline of 26%. Over this same period, the amount of farm acreage declined 16%, compared to 7.5% statewide. Du Page County experienced the greatest drop in

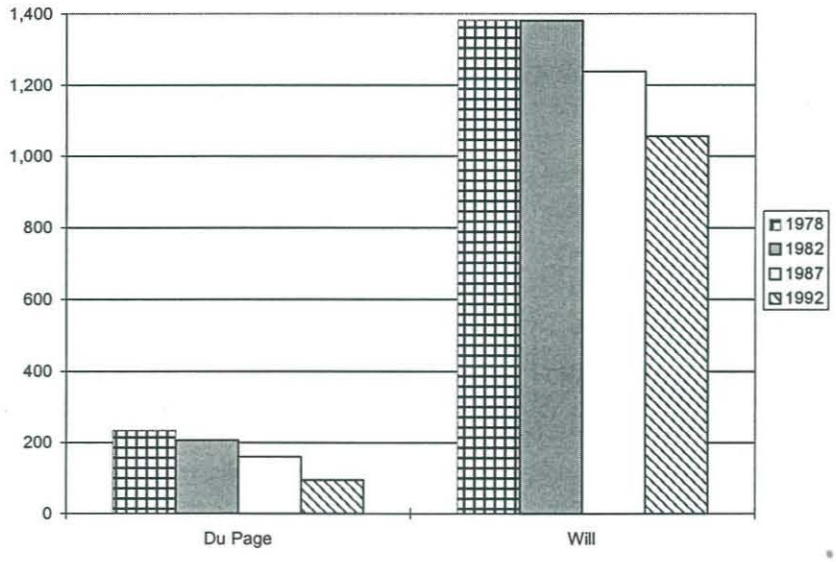
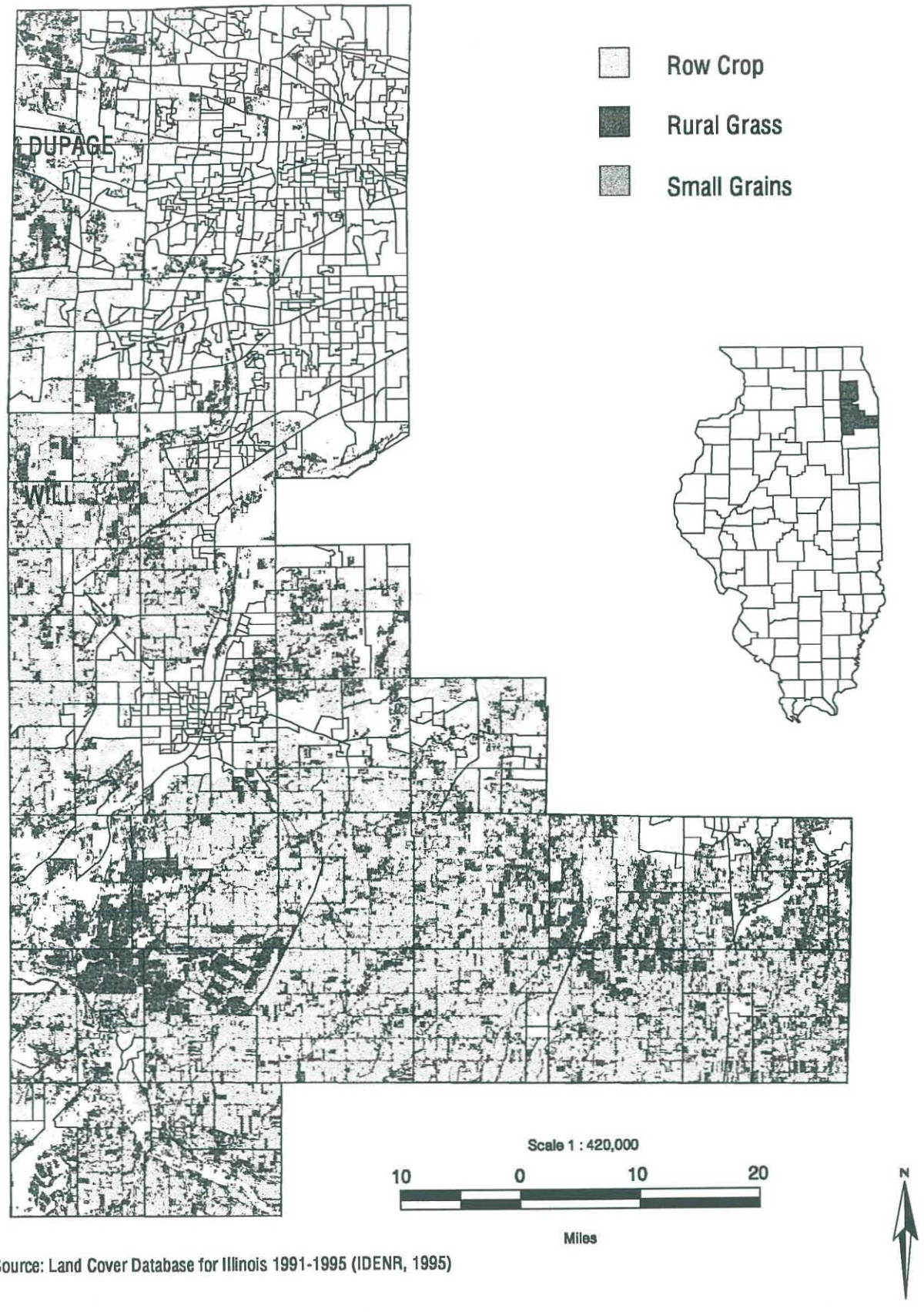


Figure 1 -31. Number of Farms in the Du Page River Area

[1] Department of Natural Resources. *Illinois Land Cover, An Atlas*, June 1996. Agricultural land is defined as cropland (planted in row crops, small grains, orchards, and nurseries) and rural grasslands (fallow fields, pasture, and greenways) and may include a small amount of non-farm grasslands.

Figure 1-32. Agricultural Land Cover



Source: Land Cover Database for Illinois 1991-1995 (IDENR, 1995)

Table 1-17. Agricultural Land Cover

	Agricultural Acres	Percent of Area
Du Page	28,322	13%
Will	370,351	68%
Region	398,673	53%
State	27,928,797	77%

farms and acreage, down 59%.[2] Even though the value of the region's agricultural land and buildings (per acre) also fell, it is still higher than the statewide average.

Conservation Practices

Soil erosion has long been a major issue in Illinois, but recent trends show an improvement in the number of agricultural acres meeting "T", tolerable soil loss levels.[3] Du Page County is not part of the statewide transect survey, but Will County is surveyed. Survey data show that 89% of Will County's farm acreage was meeting "T" in 1997, 8% was between 1-2 "T" (between three and ten tons), and 3% was greater than 2 "T" (more than ten tons soil loss).[4] This is significantly better than statewide, where 78% of the surveyed acreage is at "T".

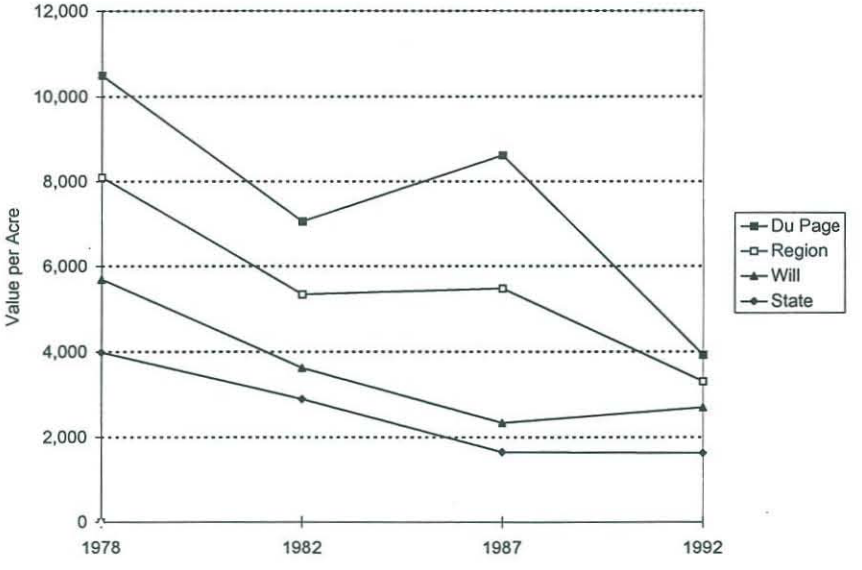


Figure 1-33. *Value of Farmland (1994 dollars)*

[2] Information taken from *Agricultural Statistics*, Illinois Department of Agriculture, various years and *Census of Agriculture,* U.S. Department of Commerce Bureau of Census, years 1978, 1982, 1987, and 1992.

[3] Tolerable soil loss levels are typically between 3 and 5 tons per acre per year. This is estimated — theoretically — to be the amount of soil loss than can occur and be replaced by natural soil building processes.

[4] Data is taken from the *Illinois T by 2000 Transect Survey Summary*, by the Illinois Department of Agriculture. The survey is done in cooperation with 98 Soil and Water Conservation Districts, and the USDA Natural Resources Conservation Service.

Table 1-18. Number of Contracts and Acres in the Conservation Reserve Program[1]

	1986	1987	1988	1989	1991	1992	1995	1997
Contracts								
Will	4	15	11	15	4	4	0	6
State	2,043	5,028	3,517	4,234	2,754	2,265	2,647	4,944
Acres								
Will	509	968	524	870	106	424	0	526
State	91,015	239,729	133,910	168,812	107,832	80,852	62,037	174,421

[1]Contracts are reported during federal fiscal periods; no listing for calendar years 1993, 1994, 1996.

Tillage practices play a large role in achieving "T". In 1997, on a regional basis, 23% of all acres were farmed with conservation tillage methods, 43% with reduced till and 34% with conventional methods. This is less than statewide where 43% use conservation methods, 22% use reduced tillage methods, and 33% use conventional methods. Conservation tillage is used on 44% of the soybean acreage, 0% of small grain acreage (although this ranged between 50%-90% in previous years), and 10% of corn acreage.

The Conservation Reserve Program[5] (CRP) was authorized by the Food Security Act of 1985 and amended in 1990. The Act pays farmers to remove highly erodible and environmentally sensitive land from production. It also provides incentives and assistance to farmers to plant grass or tree cover on highly erodible land or to address other environmental concerns. A new provision of the Act also encourages farmers to enroll and restore cropped wetland acreage.[6]

Table 1-18 presents the number of contracts and the number of acres in the conservation reserve program per year for Will County and statewide (no contracts have been issued in Du Page County). A farm can have more than one contract and, while contracts vary, most land is set aside for an average of ten years. The region has less than 1% of the state's total CRP contracts and acreage enrolled in the program Despite low participation in the CRP program and low adoption of conservation tillage practices, the region has a higher percent of acres meeting "T" than statewide.

Agricultural Cash Receipts and Production

Total Cash Receipts

Between 1980 and 1994, farm cash receipts[7] (the amount received from the sale of crops and livestock) varied due to market prices, weather, and acres planted, but declined overall. In 1994, total receipts for the Du Page River area represented a little less than 2% of Illinois farm receipts. Will County lead the area with $116 million while Du Page

[5] Data provided from Lisa Manning of the Federal Farm Service Agency, Springfield IL.
[6] United States Department of Agriculture, Farm Service Agency, *The Conservation Reserve Program.* May 1997.
[7] Dollars are adjusted to 1994.

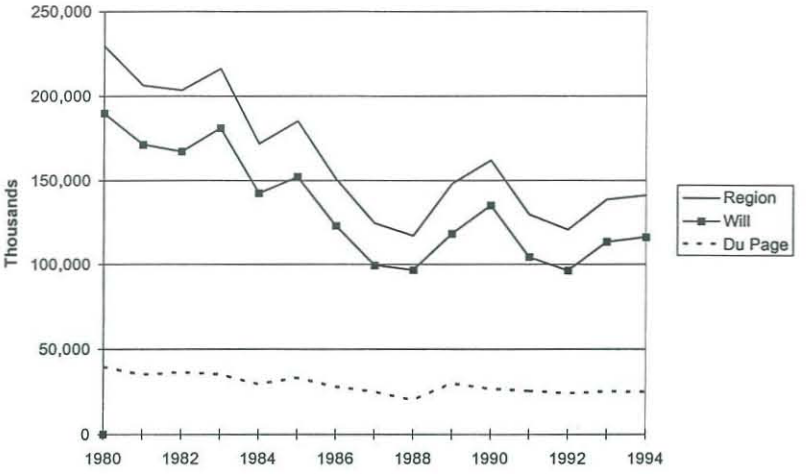


Figure 1-34. Total Cash Receipts (1994 dollars)

County had $25 million. Of the region's total receipts, 91% were from crops and 9% were from livestock.

Crop Cash Receipts

In recent years, the region's crop receipts (five-year average) were $124 million, or about 2% of the state's $5.9 billion total crop receipts.[8] Crop receipts include the sale of corn, soybeans, wheat and 'other' crops such as sweet corn, other vegetables, melons, and other fruits. "Other" crops bring in more receipts than corn and soybeans in the Du Page River area — 40%, of the total.

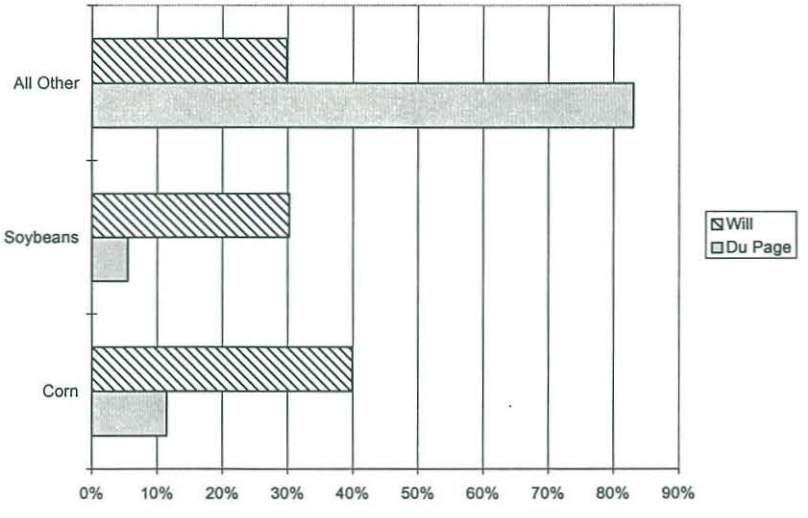


Figure 1-35. Crop Receipts by Type (1990-1994 five-year average)

[8] Due to fluctuations in seasonal production, comparisons are based on a five-year average from 1990-1994. This average was calculated for both crop and livestock cash receipts and is often used instead of the last year of data (1994).

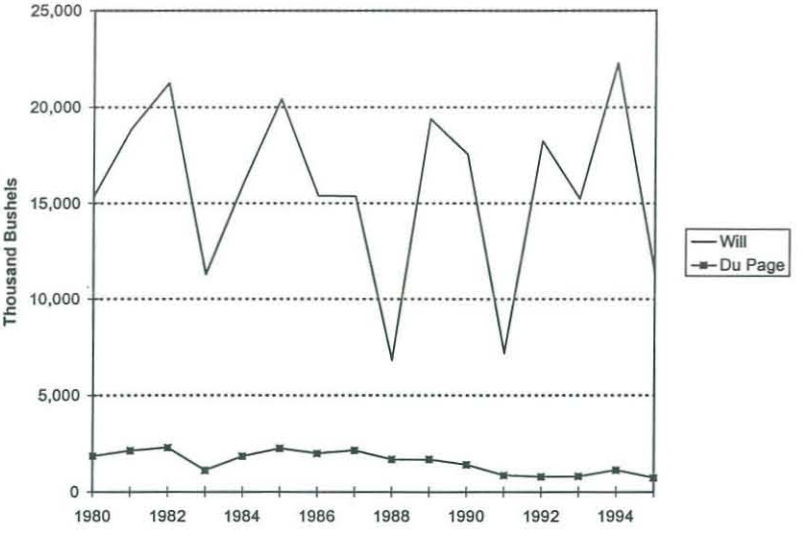


Figure 1-36. Corn Production

Will County contributes 80% of the region's crop receipts, generally from corn and almost equal amounts of beans and 'other' crops. Du Page County's crop receipts come mainly (83%) from 'other' crops. The region contributes 14% of the state's sale of nursery and greenhouse crops.

Crop Production

Production of both corn and soybeans fluctuated significantly between 1980 and 1995 due to factors such as weather and market price. Regional corn production ranged from 8.05 million bushels during the dry year of 1991 to a high of 23.5 million bushels in 1982. Will County produces 94% of the region's corn.

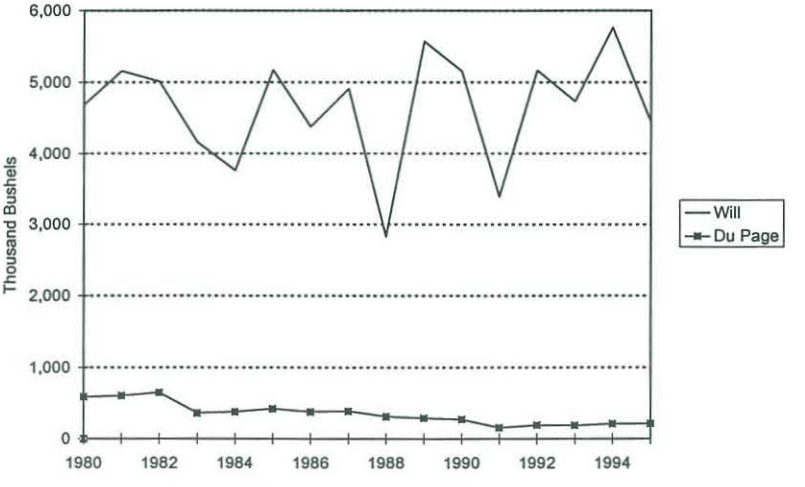


Figure 1-37. Soybean Production

Regionally, soybean production hit a low of 3.1 million bushels in 1988 and peaked at 5.9 million bushels in 1994. Will County also produces most of the region's soybeans.

Area farmers also planted wheat and 'other' crops which include crops primarily grown in nurseries or greenhouses. The region has 9% of the state's nursery acreage and greenhouse covered square footage.

Table 1-19. Farms with Nursery or Greenhouse Operations, 1992

	Farms	Acres	Covered Sq. Ft.
Du Page	28	143	1,173,225
Will	45	2,691	361,408
Region	73	2,834	1,534,633
State	1036	30,655	16,134,768

Livestock Cash Receipts

The area contributes $14.6 million (< 1%) of the state's $2.4 billion livestock cash receipts.[9] Livestock receipts come from the sale of cattle, hogs, and 'other' livestock such as dairy cattle, poultry, and sheep. Statewide, hogs provide 48% of livestock cash receipts, cattle provide 32% and 'other' livestock, 20%. Regionally, hogs provide 39%, cattle 26%, and 'other' livestock (primarily dairy cows) 35% of the receipts. Will County has the higher livestock receipts, averaging $13.6 million.

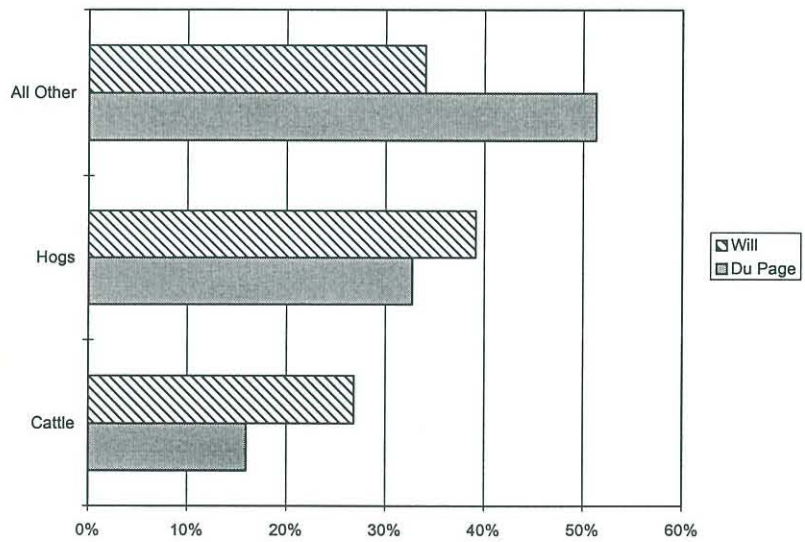


Figure 1-38. Livestock Receipts by type (1990-1994 five-year average)

[9] Due to fluctuations in seasonal production, comparisons are based on a five-year average from 1990-1994. This average was calculated for both crop and livestock cash receipts and is often used instead of the last year of data (1994).

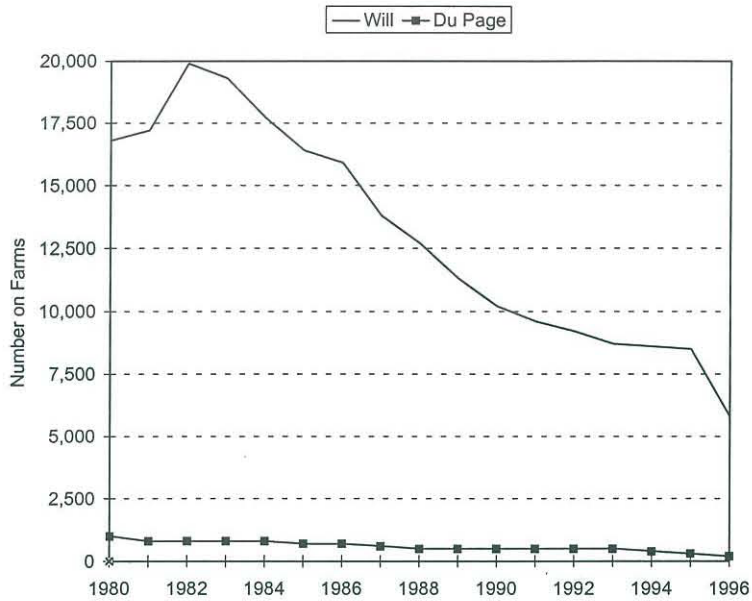


Figure 1-39. Cattle Inventory

Livestock Production

The region's livestock inventory accounts for less than 1% of cattle and hogs statewide. Between 1990 and 1995, the average inventory was 27,700 hogs and 8,800 head of cattle, with Will County leading in both. Since the early 1980s, the number of cattle has declined in the region. After peaking in 1989, the hog inventory has also declined. (Production estimates are not available for the 'other' category.)

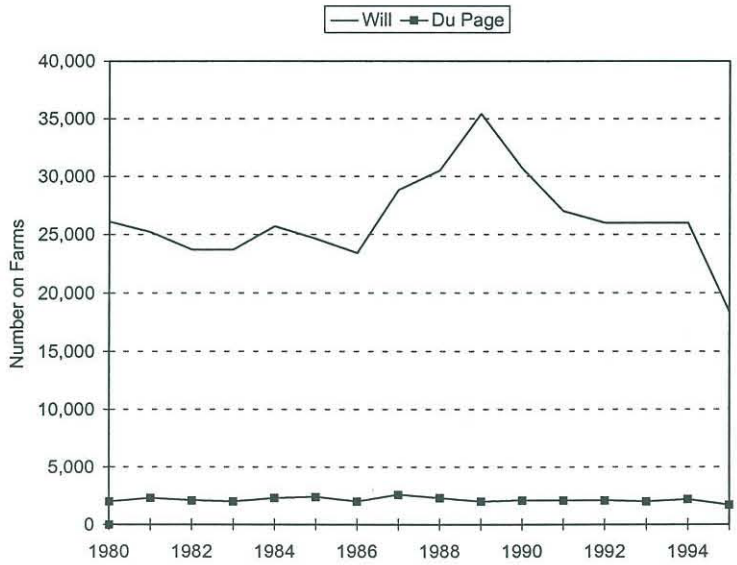


Figure 1-40. Hogs and Pigs Inventory

Conclusion

Du Page County is not a typical Illinois agricultural county — it is ranked second to last in terms of land dedicated to agriculture. Between 1978 and 1992, the number of farms and farm land acreage have both fallen 59% in Du Page County. In Will County, farm land acreage fell a little more than it did statewide while the number of farms fell slightly less. Even so, the value of area farms remains higher than the statewide average.

In Will County, 89% of farm acreage was meeting "T" in 1997, although only 23% of surveyed acres are being farmed with conservation methods. Transect survey data does not include Du Page County.

From 1990 through 1994, the region averaged $124 million in annual crop receipts and $14.6 million in livestock receipts. Between 1990 and 1995, the region averaged 16.2 million bushels of corn and 4.9 million bushels of soybeans and maintained an average annual (1990-95) inventory of 25,000 hogs and 8,800 head of cattle.

Outdoor Recreation

Fast-growing Du Page and northern Will counties, through which the Du Page River flows, are not generally known for their outdoor recreation opportunities. Expansive natural areas are few and far between, and area residents are less likely than others to participate in fishing, hunting, and boating. Ample activities are available, however, in the county forest preserve system in Du Page County.[1]

Publicly-Owned Recreation Sites

The Du Page River area does not contain any major state- or federally-owned outdoor recreation areas, though several — including Midewin National Tallgrass Prairie and I&M Canal State Trail — lie just to the south. The Du Page County Forest Preserve District does operate more than twenty preserves, most of which lie within the Upper Du Page River area. The system attracted more than 2.3 million visitors in the fiscal year ending in 1997.[2] The Blackwell, Herrick Lake, and Danada preserves, clustered in west-central Du Page County near Warrensville, are the three most popular sites with combined attendance of more than 600,000. These sites support a range of activities including fishing, boating, canoeing, camping, and picnicking. They also provide access to the regional trail system.

The Du Page River area includes four state nature preserves and twelve natural areas. These sites, which can be publicly or privately owned, include a variety of habitats, including marshes, prairies, and wooded areas. With an emphasis on natural conservation, these sites are generally undeveloped, little known, and lightly visited. One local exception is the Morton Arboretum in central Du Page County, which attracts 300,000 visitors annually.[3] The 1,700-acre botanical garden features over 3,600 types of plants, and specializes in the display and study of trees, shrubs, and vines.

Boating

Du Page and Will counties had 36,100 boat registrations in 1996, up 31.6% from 1988. Du Page County's 20,300 registrations were third-highest in the state, behind only Cook and Lake counties. Will County trails Du Page in registrations by more than 20% but its growth of 47.5% since 1988 was more than twice that of Du Page and the state as a whole.

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[1] Unless otherwise noted, information in this chapter is from IDNR promotional materials, internal documents, and discussions with IDNR personnel.
[2] Attendance data provided by the Du Page County Forest Preserve District.
[3] Information on the Morton Arboretum obtained from www.mortonarb.org.

Figure 1-41. Significant Natural Resource Areas in the DuPage River Area

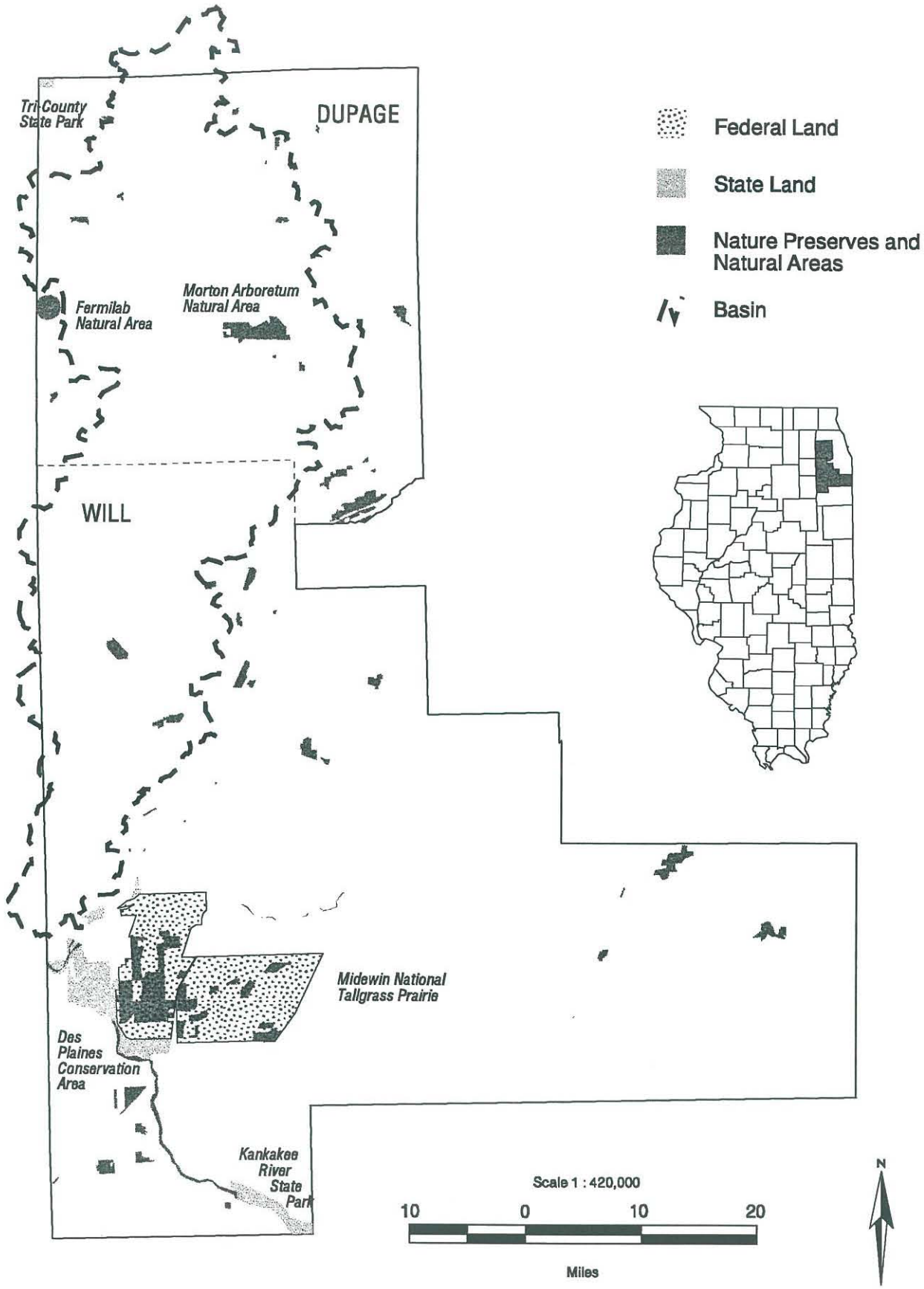


Table 1-20. Boat Registrations, 1988 and 1996

	1988	1996
Du Page County	16,714	20,306
Will County	10,726	15,810
Du Page River Area	27,440	36,116

Despite accounting for more than 9% of registrations statewide, the Du Page River counties have a fairly low rate of boat ownership. Du Page County has 20.5 boat registrations per 1,000 residents (the third lowest in the state) and Will County has 36.5, compared to 49.7 for the state (excluding Cook and the collar counties). It seems that the area's urban population is less inclined towards boating, either because of space limitations or easy access to more urban pursuits.

Fishing and Hunting

Nearly 49,000 fishing licenses[4] were purchased in Du Page and Will counties in 1996, down from 53,000 in 1993. The area accounted for about 8% of the state total. Out-of-state anglers accounted for only 1.3 % of the area's sales, well below the 6.1% statewide average.

The area has no major fishing destinations, but does have an array of small fishing lakes, including Mallard Lake (75 acres) and Herrick Lake (19 acres). Largemouth bass and bluegill are present in most of these lakes. Several streams, including the east and west branches of the Du Page River, also provide angling opportunities. Most of the streams have "C" ratings — indicating moderate water quality.

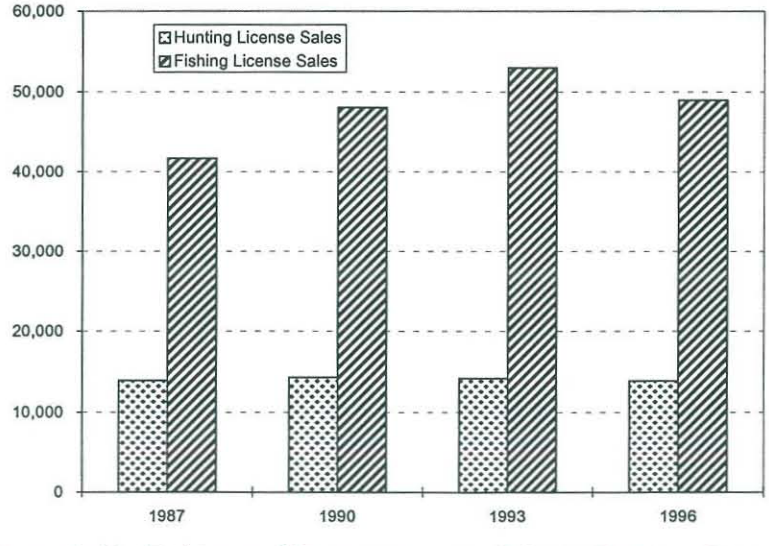


Figure 1-42. Fishing and Hunting License Sales in Du Page River Area

[4] Includes combination hunting/fishing licenses, resident fishing, non-resident fishing, 10-day non-resident fishing, and Lake Michigan fishing licenses.

Table 1-21. Hunting Activity

Game	Hunters	Days Afield	Harvest
Deer		45,238	1,039
Long Gun	1,000	3,653	488
Archery	2,345	41,585	551
Pheasant	5,558	35,795	19,565
Rabbit	4,130	26,528	20,110
Dove	2,488	14,055	47,849
Squirrel		10,512	10,824
Fox	1,237	7,313	8,309
Gray	719	3,199	2,515

Hunters purchased 13,800 hunting licenses[5] in the Du Page River area in 1996, slightly below previous levels. These sales accounted for only 4.4% of the state total. Low hunting activity in the area is due mostly to its urban character. Firearm deer hunting, the most popular hunting activity (in terms of participation) across most of the state, is not permitted in Du Page County.

Still, deer is the most popular game in the area, based on the estimated 45,200 hunter-days in the field annually.[6] Local deer hunters account for 2.7% of the state's archery hunting activity. Pheasant is the next most popular game, followed by rabbit, dove, and squirrel.

Out-of-state hunters accounted for 1.3% of all license sales, compared to 3.4% statewide. Many local residents regularly go to more rural areas, including nearby Indiana and Wisconsin, to hunt.

Conclusion

The Du Page River area is most significant for its urban location. It does not include any state outdoor recreation areas, but does have several popular county forest preserves. Du Page and Will counties together account for 9% of all boat registrations in Illinois (more than 36,000), due more to the area's large population than to the popularity of boating. About 8% of Illinois fishing licenses were purchased in Du Page and Will counties, a significant amount but less than the area's share of Illinois' population. The urban character of the area does deter hunting; firearm deer hunting is not allowed in Du Page County and only 4% of state hunting licenses are sold here. Out-of-state visitors account for a low percentage of the local hunting and fishing activity.

[5] Includes combination hunting/fishing, resident hunting , and 5-day non-resident hunting licenses.

[6] Hunting data from IDNR's "Hunter Activity and Wildlife Harvest in Illinois: County Averages for 1989-1993". This report relied on mailed hunter surveys. The authors caution that no adjustments were made to account for known biases inherent to this sampling technique.

Transportation Infrastructure

A region's transportation infrastructure — its roadways, airports, waterways, and railways — enables businesses and residents to move goods and people. Coupled with information regarding demographics and economics, trends in transportation infrastructure and its usage are strong indicators of the nature of a region's development and its suitability for various resource management strategies.

Auto Traffic

Roads[1]

Located west and southwest of the Chicago metro area, the Du Page River area is traversed by several major interstates that allow travel into Chicago and to the southern and northwestern parts of the state. The interstates include I-55, I-80, I-290, I-355, I-88 and I-294. Between 1973 and 1995, 1,452 miles of road were added in the area, bringing the total to 5,962 miles, 4.29% of the state's total mileage. Since 1980 the area's road miles grew 1.17% annually, significantly more than the state's 0.19% annual growth rate. Of the two counties in the area, Du Page County has the larger road network with 52% of the area's roads.

Table 1-22. Miles of Road in the Du Page River area

	1973	1985	1995
Du Page	2,130	2,728	3,080
Will	2,380	2,759	2,882
Region	4,510	5,486	5,962

Vehicle Registration

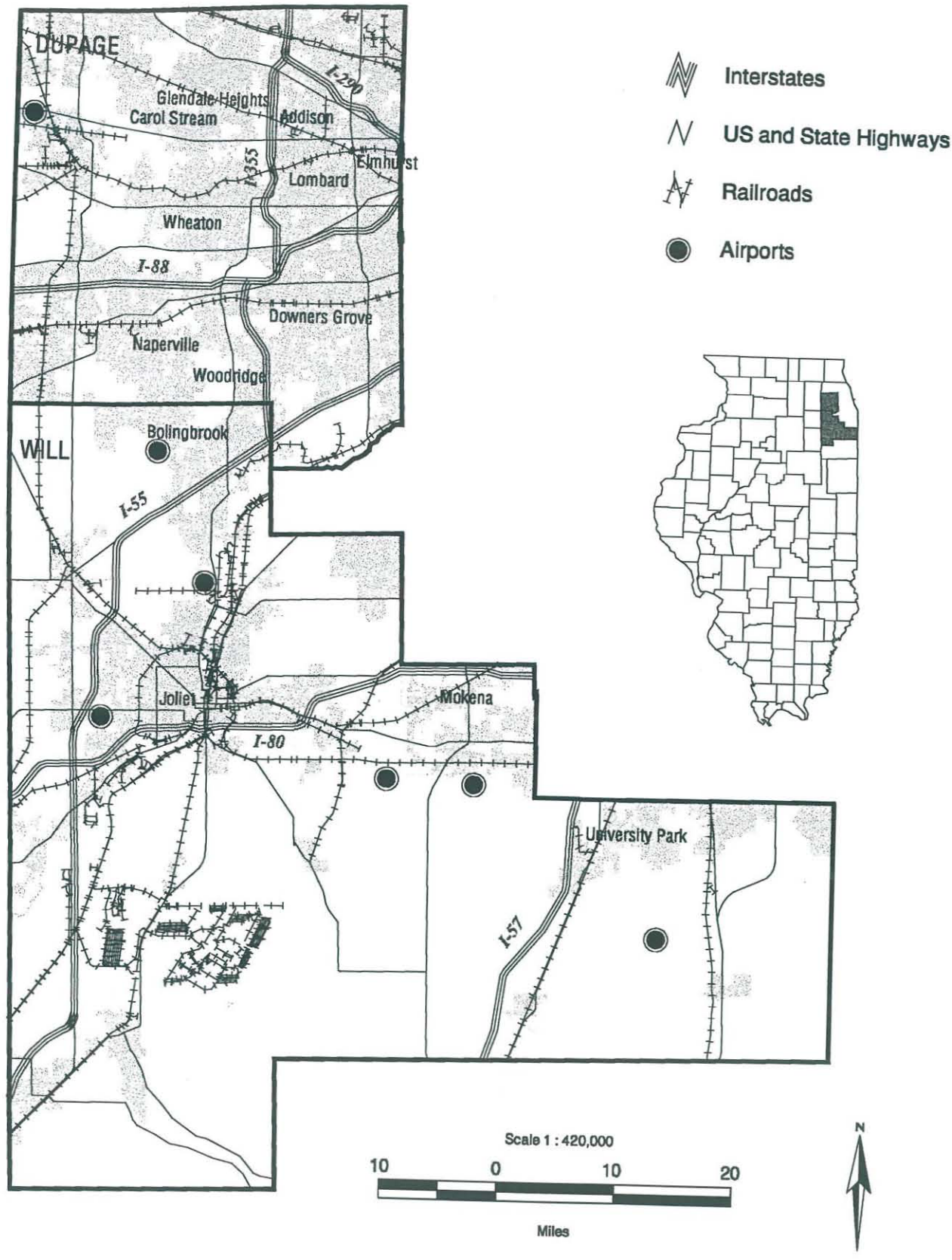
Area residents registered 847,101 passenger cars in 1995,[2] with 71% of those registered in Du Page County. Registrations increased 87% over 1975 levels, much higher than the 27.3% increase statewide.

Unlike other areas of the state, motorcycle registrations have increased here. Between 1975 and 1985, registrations increased from 18,006 to 20,119 and by 1995 they had increased to 23,066. During this twenty-year period, there were temporary hikes in the

[1] Mileage data from Illinois Department of Transportation, Office of Planning and Programming, *Illinois Travel Statistics*, various years.

[2] Vehicle registration data from the State of Illinois Office of the Secretary of State, *County Statistical Report for Motor Vehicle License Units and Transactions Received*, various years.

Figure 1-43. Major Airports, Roads and Railroads



price of gasoline which caused a peak in the number of motorcycle registrations statewide. The continued increase in this region is probably due to the overall increase in vehicle registrations.

Registrations for trucks (excluding semis) and buses in the area increased from 58,549 to 133,340 between 1975 and 1995, an annual growth rate of 4.1%, higher than the state average of 2.3%. In 1995, roughly 80% of the vehicles in this category were pick-ups, which have been reported separately since 1988. Statewide, 5.4 cars are registered for every truck, while in this area 8 cars are registered for every truck.

Roughly 64 thousand semis and trailers were registered in the two counties in 1995, about 30 thousand more than the number registered in 1975.[3] Of course, semis usually function as long-distance haulers; locally-registered semis may spend little time at "home", while out-of-town semis routinely drive through. How many miles semis drive locally is difficult to determine from available data.

Vehicle-Miles Traveled

In 1995, the Du Page River area accounted for an estimated 10,802 million annual vehicle-miles traveled (VMT), 11.45% of the state total. Du Page County had 67% of the area's VMT (7,268 million) and Will County had the remaining 33% (3,533 million).

Since 1973 VMT in the area has grown at an average annual rate of 3.32%, compared to a statewide average of 2.0%.[4] This growth level has not been constant. Between 1973 and

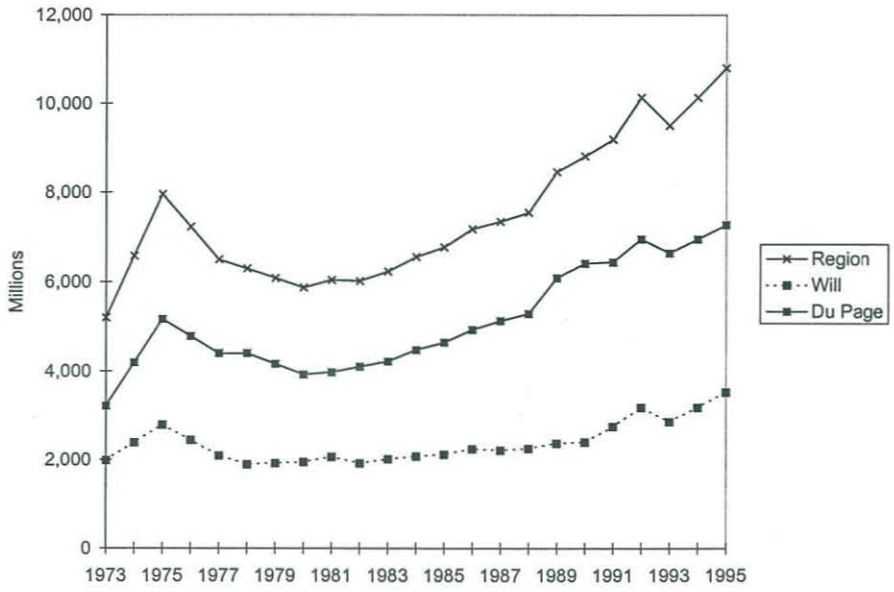


Figure 1-44. Vehicle-Miles Traveled

[3] This figure does not include roughly 21,545 "regional" trucks — mostly semis — registered through IDOT's IRP program, where licensees pay prorated fees based on the percentage of miles driven in Illinois.
[4] VMT data from *Illinois Travel Statistics*.

1980, an era marked by oil shortages in 1973 and 1978, the area's VMT decreased by 0.06% annually. Clearly drivers adjusted to high gas prices by driving less. From 1980 to 1995 annual VMT growth was 4.07%.

Other Traffic

Bus Lines

Intercity bus service in the Du Page River area is provided by Greyhound Bus in Joliet (Will County).[5]

Air Traffic

Seven airports service the area: a general aviation airport in Joliet; public reliever airports at West Chicago in Du Page County and at Romeoville in Will County; and private airports at New Lenox, Frankfort, Monee, and Plainfield, all in Will County.[6]

Water

Illinois has 1,119 miles of commercial navigable waterways and one of its six major waterways, the Illinois River system, runs through the Du Page River area. The river supports significant commercial traffic, handling such products as dry chemicals, steel products, fly ash, coal, cement, grain, sand and gravel, petroleum products, and soybeans.[7]

Rail

Four high density freight rail services (lines transporting over 5 million tons of freight per mile) and two light density service lines run through this area.[8]

The Du Page River area has Amtrak passenger rail service at Joliet, Naperville and LaGrange. Metra provides commuter rail service for the six-county Chicagoland region, which includes stops in Will and Du Page counties.

Conclusion

Several major interstates traverse the region, allowing travel into Chicago and to the southern and northwestern parts of the state. Between 1973 and 1995, 1,452 miles of road were added, a 33% increase, while the number of vehicle-miles traveled more than doubled. The area has access to seven airports, Greyhound bus service and Amtrak passenger rail service.

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[5] Personal communication with the Chicago Greyhound Station agent.
[6] See Illinois Department of Transportation, Division of Aeronautics, *Illinois Airport Directory*, 1996.
[7] River terminal data from IDOT's *Illinois Directory of Lake and River Terminals 1994.*
[8] Rail density data from IDOT's *Illinois Rail Plan: 1991-92 Update.*

Property Taxes

Property taxes are the major source of tax revenue for local government in Illinois, providing more than 75% of total revenue. [1] These taxes finance the majority of local government services, including school districts, county, township, and municipal governments, and special districts such as fire, park, sanitary, library, and airport.

Property taxes depend primarily on the tax rates and the equalized assessed valuation[2] (i.e., tax base) of property in the county. The tax rate is dependent on the amount of revenue sought by the local governments (tax levy), the assessed value of the property (tax base), and the legal maximum tax rate. The tax base is based primarily on the assessed values, which are usually reassessed every four years, and the amount of residential, commercial, and industrial expansion.

Tax Revenues

Property tax revenues in Illinois have increased significantly in the last fifteen years, after a steady decline during the 1970s and early 1980s. Property tax revenues collected in Illinois went from more than $9.8 billion in 1971 to almost $13.3 billion in 1996.

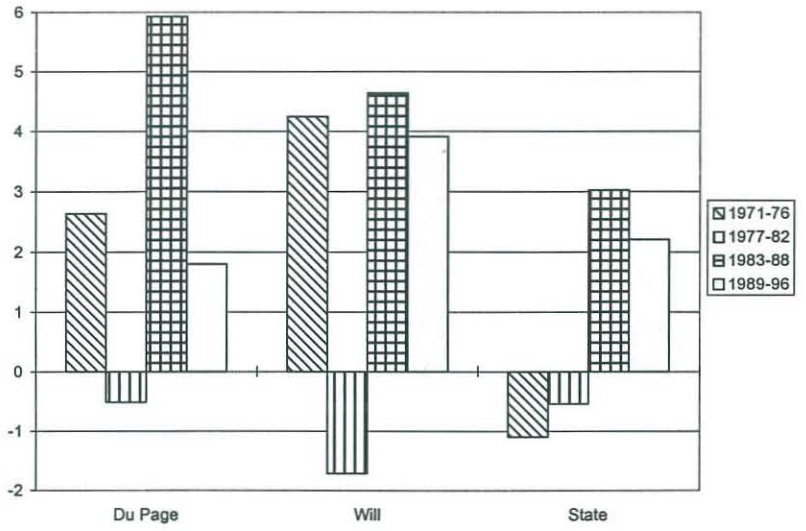

Figure 1-45. Average Annual Percentage Change in Property Tax Revenue (using 1996 dollars)

[1] All property tax data is from Illinois Department of Revenue, *Illinois Property Tax Statistics*, various years.

[2] Equalized assessed valuations are determined by several factors including:

- property is assessed at 33.3% of fair market value (except where property is classified);
- equalization process is to correct for counties which over- or under assess property;
- the amount of farmland in a county, which is assessed on productivity instead of market value.

Figure 1-46. Major Property Tax Districts

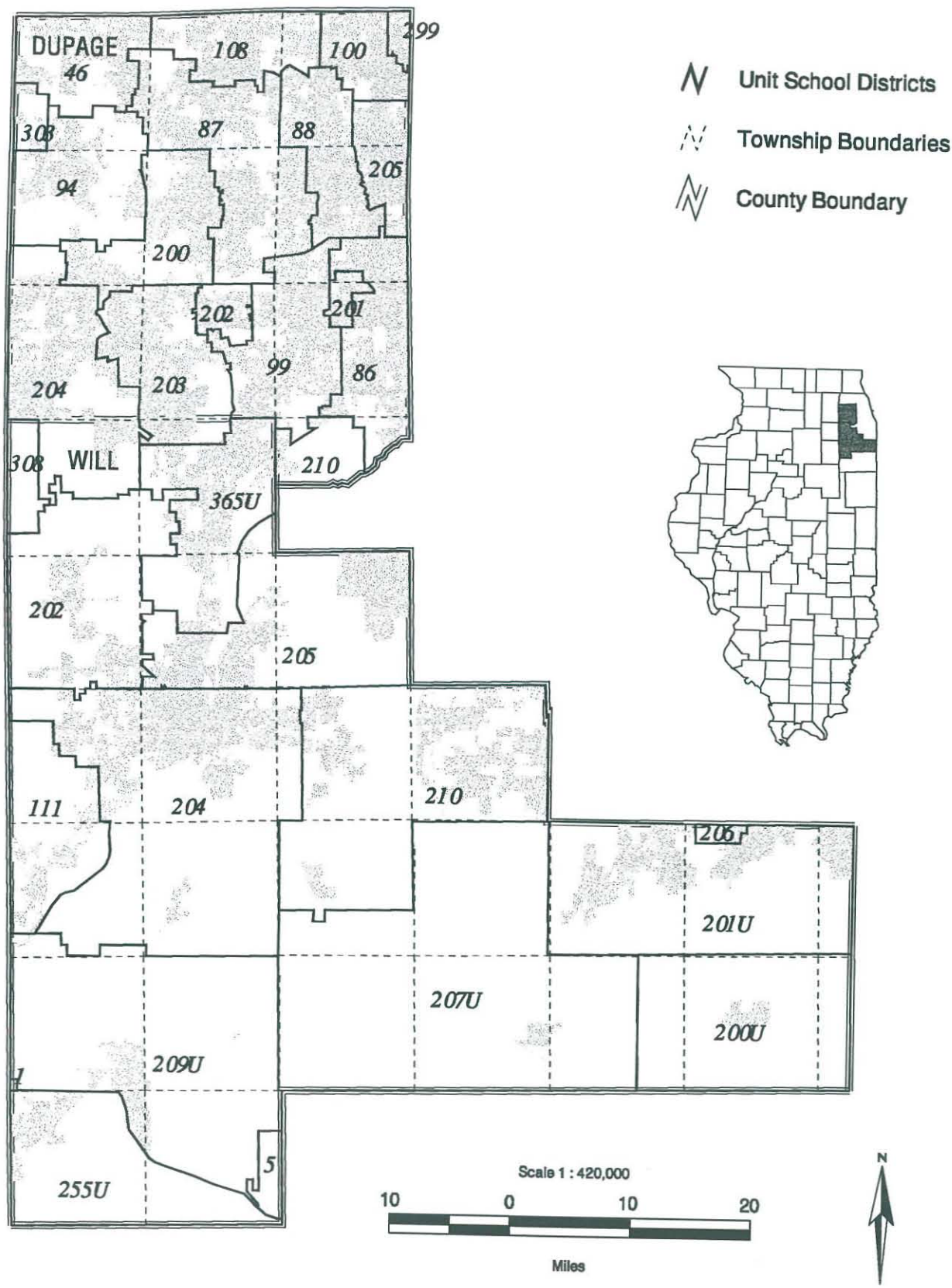

Table 1-23. Property Tax Revenue
(Million 1996$)

	1971	1975	1980	1985	1990	1996
Du Page	528.8	583.2	697.9	798.5	1,146.0	1,259.9
Will	213.6	250.3	245.7	253.6	362.1	462.3
Region	742.4	833.6	943.6	1,052.0	1,508.1	1,722.2
State	9,822.5	9,172.4	8,696.8	9,059.8	11,571.8	13,289.5

In the Du Page River area, property taxes have fluctuated between $742 million and $1.72 billion annually, growing 132% since 1971. More than 73% of the area's property taxes are from Du Page County.

Property Tax Base

The property tax base in Illinois has declined 6% since 1969, though it has rebounded (37% increase) from the low point in 1985. In the Du Page River area, the tax base increased 115%. The largest increase was in Du Page County, where the tax base rose more than 150%.

Figures 1-48 and 1-49 show the make-up of the tax base in 1981 and 1996 by the different classes of property. In 1996, residential property provided the largest chunk of the state's tax base (56%), followed by commercial (27%), industrial (13%), and farm property (4.5%). This was not much of a change from 1981 except that farm property dropped from 12.4% to 4.5% of the tax base. Because of this decline, residential and commercial properties accounted for a higher proportion of the tax base in 1996 than in 1981.

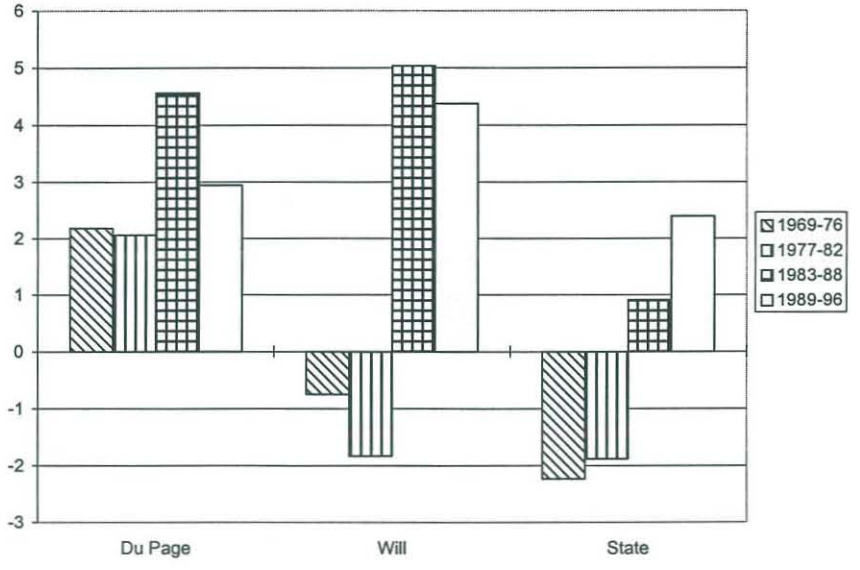

Figure 1-47. Average Annual Percentage Change in Property Tax Base (using 1996 dollars)

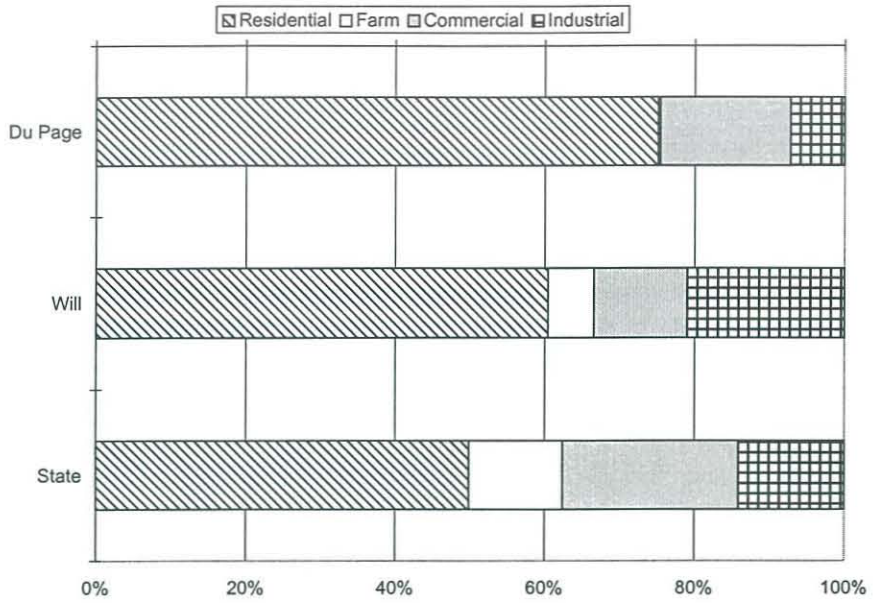

Figure 1-48. 1981 Property Tax Base by Class of Property

In the Du Page River area, the make-up of the tax base varies from the state's. Both counties obtain a larger percent of their tax base from residential property — 72% in Du Page County and 67% in Will County. Will County also obtains a relatively large share of its tax base from industrial property (21%).

This distribution of the tax base has not varied much since 1981. The only noticeable change is in Will County where there has been a moderate decline in the farm property tax base and a corresponding increase in the residential property tax base. This change is due to the urbanization occurring in the county.

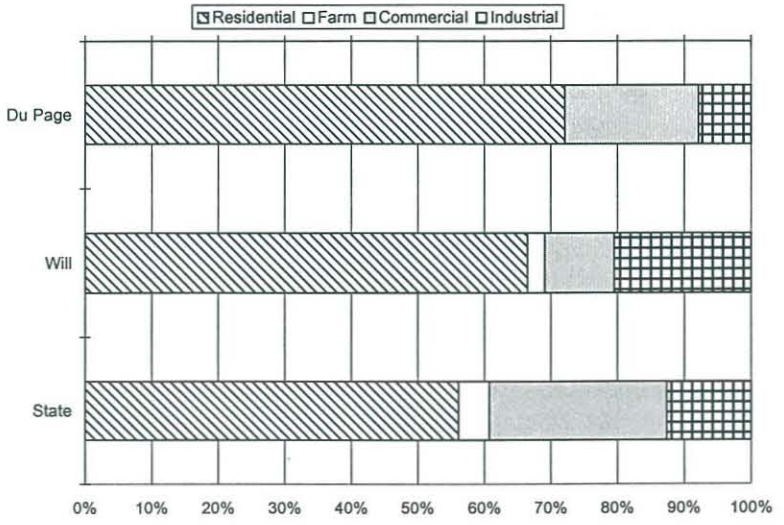

Figure 1-49. 1996 Property Tax Base by Class of Property

Table 1-24. Property Tax Base
(Million 1996$)

	1969	1975	1980	1985	1990	1996
Du Page	7,790	8,470	10,399	10,935	16,487	19,456
Will	4,537	4,061	4,030	4,120	5,531	7,105
Region	12,326	12,530	14,429	15,055	22,018	26,561
State	176,663	145,484	128,518	120,683	141,978	165,443

Tax Rates

Over the past couple of decades the average property tax rate has risen in the state and in the area. The tax rate is typically expressed in dollars collected per $100 dollars of tax base. Since 1966, the statewide average property tax rate has risen from $4.60 to $8.15 per $100 of tax base — up almost 78%. The tax rate has increased 31% in Du Page County and 55% in Will County. The area rate has remained significantly below the state average and the spread has grown during the 1990s; in 1996 it was 20% lower in Du Page County and 19% lower in Will County.

Property Tax Distribution

In Illinois, property taxes are used to finance a variety of local government services, with the majority (61%) going to school districts. The remainder goes to municipal (16%), county (10%), and township governments (3%), and to other services (12%) such as fire, sanitary, park, library, and airport services. A majority of the area's property tax revenue also goes to schools — 70% in Du Page County and 64% in Will County. These higher levels to schools, relative to the state average, is offset by lower distributions to city

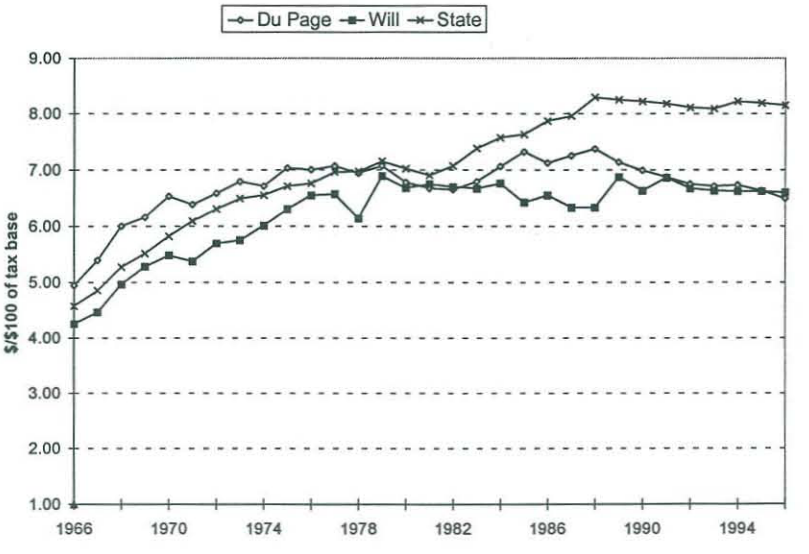

Figure 1-50. Average Property Tax Rate

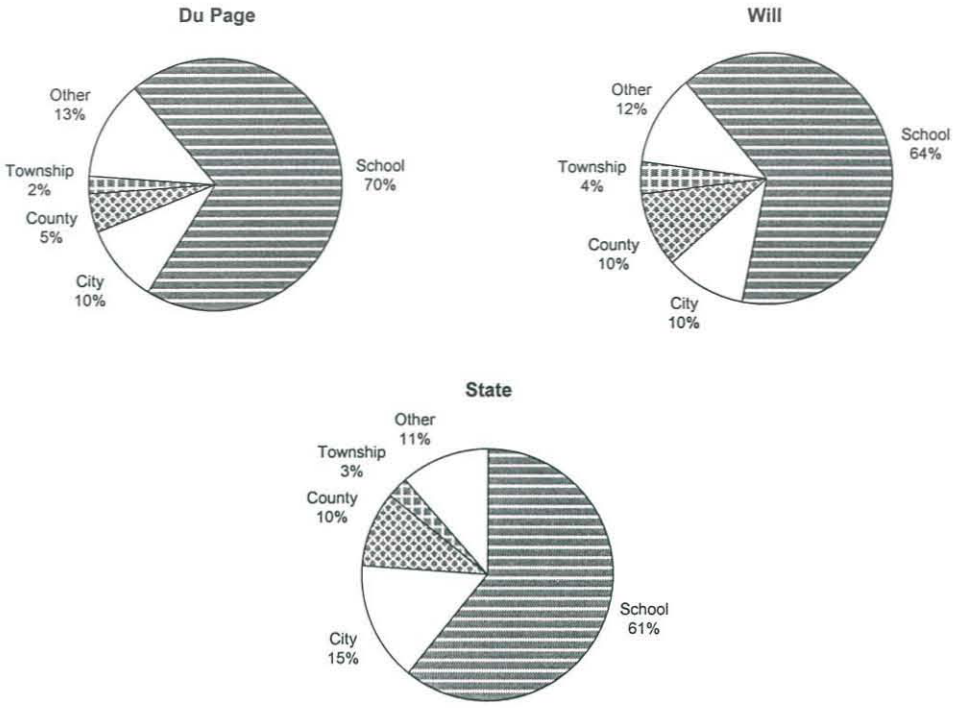

Figure 1-51. 1996 Property Tax Distribution[3]

governments. Compared to 1980, more area property taxes are being distributed to schools and special taxing districts and less to city, county, and township governments.

Conclusion

Property tax revenues have grown significantly in the Du Page River area, up 132% compared to a 35% increase statewide.

Property taxes are determined by the tax base and the tax rate. Overall, the tax base has declined and tax rates have risen in the state. In the Du Page River area, both the tax base and tax rates have risen, though tax rates have increased considerably less in the area than in the state as a whole.

The majority of the tax base statewide is from residential property. This is also true in the Du Page River area, where an even larger share of the tax base is from residential property. In Will County, a relatively large percentage of the tax base is also from industrial property. In both the Du Page River area and the state, the majority of property tax revenue goes to school districts.

[3] The property tax distributions are based on total property taxes extended, which is the dollar amount of taxes billed to property taxes extended. This is different from the amount collected due to charges against collections such as protest, delinquencies, certificates of error and other changes. The amount collected is typically more than 97% of the amount of taxes extended.

References

Demographics

Bureau of Economic and Business Research. 1990 and 1993. Illinois Statistical Abstract. Champaign, IL. University of Illinois at Urbana-Champaign.

Illinois Department of Natural Resources. 1996. Illinois Land Cover, An Atlas. Springfield IL.

Illinois Secretary of State. 1993. Illinois Counties & Incorporated Municipalities. Springfield, IL.

U.S. Department of Agriculture, Soil Conservation Service. 1982, 1987 and 1992. National Resources Inventory.

U.S. Department of Commerce, Bureau of the Census. 1970 Census of Population. General Social and Economic Characteristics: Illinois. Washington, D.C. U.S. Government Printing Office.

U.S. Department of Commerce, Bureau of the Census. 1970 Census of Housing. Volume 1. Housing Characteristics for State, Cities, and Counties. Part 15: Illinois. Washington, D.C. U.S. Government Printing Office.

U.S. Department of Commerce, Bureau of the Census. 1970 and 1980. Census of Population. General Population Characteristics: Illinois. Washington, D.C. U.S. Government Printing Office.

U.S. Department of Commerce, Bureau of the Census. 1980 Census of Population and Housing. Summary Characteristics for Governmental Units and Standard Metropolitan Statistical Areas: Illinois. Washington, D.C. U.S. Government Printing Office.

U.S. Department of Commerce, Bureau of the Census. 1990 Census of Population and Housing. Summary Population and Housing Characteristics. Washington, D.C. U.S. Government Printing Office.

U.S. Department of Commerce, Bureau of the Census. 1990 Census of Population and Housing. Summary Social, Economic , and Housing Characteristics. Illinois. Washington, D.C. U.S. Government Printing Office.

Woods & Poole Economics, Inc. 1998 State Profile: Illinois. Washington, D. C.

Health Trends

Illinois Department of Public Health. 1960-1970, 1975, 1985, 1990. Vital Statistics Illinois. Springfield, IL.

Illinois Department of Public Health. 1991-1995. Vital Statistician. Springfield, IL.

The Regional Economy

United States Department of Commerce, Bureau of Economic Analysis. 1995. Regional Economic Information System, 1969-1995. Washington, D.C.

Agriculture

Illinois Department of Agriculture. 1981-1994. Agricultural Statistics. Springfield IL.

Illinois Department of Natural Resources. 1996. Illinois Land Cover, An Atlas. Springfield IL.

Illinois Department of Agiculture. 1994-96. Illinois "T" by 2000 Transect Survey Summary. Springfield, IL.

United States Department of Agriculture, Farm Service Agency. 1997. The Conservation Reserve Program. Washington D.C.

United States Department of Commerce, Bureau of the Census. 1978, 1982, 1987, 1992. Census of Agriculture. Washington, D.C.

Outdoor Recreation

Anderson, W.L., L.K. Campbell, and D.M. Witzany. 1995. Hunter activity and wildlife harvest in Illinois: county averages for 1989-1993. Federal Aid Projects W-99-R and W-112-R. Springfield, IL. Illinois Department of Conservation.

Transportation Infrastructure

Illinois Department of Transportation, Office of Planning and Programming. 1973-1993. Illinois Travel Statistics. Springfield, IL.

Illinois Department of Transportation. 1995. Illinois Airport Inventory Report 1995. Springfield, IL.

Illinois Department of Transportation. 1992. Illinois Rail Plan: 1991-1992 Update. Springfield, IL.

Illinois Secretary of State. 1970-1992. County Statistical Report for Motor Vehicle License Units and Transactions Received. Springfield, IL.

Property Taxes

Illinois Department of Revenue. 1966-1995. Illinois Property Tax Statistics. Springfield, Illinois.

PART II

ENVIRONMENTAL QUALITY

Contributors

Air Quality and Surface Water Quality

Project Coordinator ..... Nani Bhowmik

Report Coordinator..... Becky Howard

Maps ..... Kathleen Brown

Air Quality..... Donald Gatz

Surface Water Quality..... Shundar Lin

Hazardous and Toxic Waste Generation and Management

Project Coordinator ..... John Marlin

Hazardous and Toxic Waste Generation and Management ..... George Krumins

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Air Quality

Air Pollutant Concentrations

The DuPage River Assessment Area lies primarily across DuPage County and northwestern Will County. It is located entirely within the U.S. Environmental Protection Agency's (USEPA's) Metropolitan Chicago Interstate Air Quality Control Region (AQCR) 67. Seven air quality measurement stations lie in or near the basin. Air quality data for 1993-1997 from these stations are summarized in Tables 2-1–2-7. Two additional tables summarize regional point sources emissions and the deposition of major ions in precipitation.

Table 2-1 lists the seven air quality measurement locations, along with their Universal Transverse Mercator (UTM) coordinates and the criteria pollutants measured at each (Illinois Environmental Protection Agency, IEPA, 1998). Criteria pollutants are those for which federal air quality standards have been set. Published annual reports from the IEPA (1994-1998) indicate that data for ozone (O_3) (Table 2-2), particulate matter (Table 2-3), sulfur dioxide (SO_2) (Table 2-4), carbon monoxide (CO)(Table 2-5), nitrogen dioxide (NO_2)(Table 2-6) and lead (Pb)(Table 2-7) are available from one or more of these sampling sites.

Table 2-1. Air Quality Site Directory for the DuPage River Assessment Area
(Selected Sampling Sites from U.S. EPA Air Quality Control Region 67)

City name (AIRS code)	Address	UTM Coordinates (km)		Measurements
AQCR 67				
Lisle (0436001)	Morton Arboretum Route 53	N. E.	4629.361 410.891	SO2, O3
Naperville (0434002)	City Hall 400 S. Eagle St.	N. E.	4624.841 404.230	PM10
Braidwood (1971011)	Com Ed Training Center 36400 S. Essex Rd.	N. E.	4563.890 400.178	VOC, NOx, O3, CO
Joliet (1971002)	Pershing Elem. School Midland & Campbell Sts.	N. E.	4597.636 406.854	PM10, Pb
Joliet (1970013)	Water Plant West Rte. 6 & Young Rd.	N. E.	4590.279 401.284	SO2, PM10
Rockdale (1971009)	Volunteer Fire Dept. Midland & Otis	N. E.	4595.330 406.953	PM10
South Lockport (1971008)	Fitness Forum 2021 Lawrence	N. E.	4603.045 412.075	O3

Air quality standards are written to protect human health (primary standards) and welfare (secondary standards). Because health and ecological effects vary according to the nature of the pollutant, standards also vary in terms of averaging times and the metric (maximum or mean) of the measurement. For example, the ozone standards are written in terms of the maximum daily 1-hour and 8-hour average concentrations, while the particulate matter standards are written in terms of the maximum 24-hour average and the annual mean concentrations.

Table 2-2 gives ozone data for Lisle, Braidwood, and South Lockport, Illinois. Note that ozone was measured only between April and October (the ozone season) of each year. The values listed are the highest 1-hour and 8-hour mean concentrations each year. The 1-hour values are in the range of 0.082 to 0.130 parts per million (ppm). The 0.130 ppm concentration measured at South Lockport in 1994 exceeded the 1-hour standard for ozone. 1997 was the first year for reporting 8-hour ozone concentrations. The observed maximum 8-hour concentrations of 0.077 ppm at South Lockport and 0.078 ppm at Lisle were below the 0.08 ppm standard. However, the maximum 8-hour concentration of 0.089 ppm at Braidwood exceeded the standard. The 1997 values at all three sites were below the respective statewide means of 0.104 ppm and 0.090 ppm for the highest 1-hour and 8-hour concentrations, respectively. These values were computed from data from all Illinois monitoring stations, which are located primarily in the Chicago and Metro-East population centers.

Table 2-2. Daily Maximum Ozone Concentrations, April through October
(in parts per million, ppm)

			Highest value				
Station	Address		1993	1994	1995	1996	1997
Lisle	Morton Arboretum	1-hr mean	0.082	0.107	0.110	0.102	0.099
	Route 53	8-hr mean	---	---	---	---	0.078
Braidwood	Com Ed Training Center	1-hr mean	0.089	0.082	0.116	0.095	0.096
	36400 S. Essex Rd.	8-hr mean	---	---	---	---	**0.089**
South Lockport	Fitness Forum	1-hr mean	0.094	**0.130**	0.119	0.096	0.083
	2021 Lawrence	8-hr mean	---	---	---	---	0.077

Note: The bold values indicate observed exceedences of the 1-hour primary standard of 0.12 parts per million (ppm) or the 8-hour primary standard of 0.08 ppm. Reporting of 8-hour mean ozone concentrations began in 1997.

Table 2-3 lists PM_{10} data for 1993-1997. No measurements of fine particulate matter ($PM_{2.5}$) were reported for any of the sampling sites in or near the basin. The highest annual maximum 24-hour mean PM_{10} concentration observed was 125 micrograms per cubic meter ($\mu g/m^3$) at Rockdale in 1994, and the lowest was 40 $\mu g/m^3$ at the Joliet Water Plant West, also in 1994. Annual mean PM_{10} concentrations ranged from 19 $\mu g/m^3$ at Lisle in 1995, to 34 $\mu g/m^3$ at Rockdale in 1994. No exceedences of the PM_{10} particulate

matter standard were observed at any of these sites. The 1997 PM_{10} concentrations at all four sites were lower than the corresponding statewide average maximum 24-hour value of 71 $\mu g/m^3$ and the statewide annual mean of 28 $\mu g/m^3$.

Table 2-3. Concentrations of Particulate Matter
(in micrograms per cubic meter, $\mu g/m^3$)

Station	Address	Size		1993	1994	1995	1996	1997
Lisle	Morton Arboretum	PM_{10}	Max 24-hr mean	48	62	45	47	59
	Route 53		Annual mean	21	20	19	20	23
Joliet	Pershing Elem. School	PM_{10}	Max 24-hr mean	78	124	61	57	46
	Midland & Campbell Sts.		Annual mean	26	25	24	22	23
Joliet	Water Plant West	PM_{10}	Max 24-hr mean	---	40	60	62	66
	Rte. 6 & Young Rd.		Annual mean	---	20	22	21	24
Rockdale	Volunteer Fire Dept.	PM_{10}	Max 24-hr mean	60	125	66	54	48
	Midland & Otis		Annual mean	*	34	26	24	25

Note: An asterisk (*) indicates that data did not meet the minimum statistical selection criteria. There were no observed exceedences of the PM_{10} annual mean primary standard of 50 $\mu g/m^3$ or the 24-hr primary standard of 150 $\mu g/m^3$ at any station. None of these sites made $PM_{2.5}$ measurements during 1993-1997.

Table 2-4 shows SO_2 data, including maximum observed 3-hour and 24-hour concentrations, as well as annual mean concentrations, for Lisle and the Water Plant West site in Joliet. The maximum 3-hour mean concentrations ranged from 0.053 ppm at the Lisle site in 1996 to 0.091 ppm at the Joliet site in 1995. Maximum 24-hour mean concentrations ranged from 0.020 ppm at Lisle to 0.037 ppm at the Joliet site, both in 1995. Annual mean concentrations ranged from 0.003 ppm at Lisle in 1994-1996 to 0.005 ppm at the Joliet site in 1997. No exceedences of any of the primary or secondary standards for 3-hour mean, 24-hr mean, or annual mean SO_2 were observed. The 1997 maximum concentrations for the 3-hour mean (0.063 and 0.072 ppm) and 24-hr mean (0.022 and 0.028 ppm) at the Lisle and Joliet sites, respectively, were less than the corresponding statewide averages of 0.138 ppm and 0.043 ppm, respectively, and the annual means at Lisle and Joliet (0.004 and 0.005 ppm) were also less than the statewide mean of 0.006 ppm.

Table 2-4. Sulfur Dioxide Concentrations
(in parts per million, ppm)

Station	Address		1993	1994	1995	1996	1997
Lisle	Morton Arboretum	3-hr mean	0.055	0.079	0.062	0.053	0.063
	Route 53	24-hr mean	0.028	0.027	0.020	0.021	0.022
		Annual mean	0.004	0.003	0.003	0.003	0.004
Joliet	Water Plant West	3-hr mean	0.086	0.087	0.091	0.072	0.072
	Rte. 6 & Young Rd.	24-hr mean	0.030	0.036	0.037	0.029	0.028
		Annual mean	0.004	0.004	0.004	0.004	0.005

Note: There were no observed exceedences of the annual mean primary standard of 0.03 ppm, the 24-hr primary standard of 0.14 ppm, or the 3-hr secondary standard of 0.50 ppm.

Table 2-5 shows maximum 1-hour and 8-hour mean concentrations of carbon monoxide (CO) at Braidwood for 1996-1997. Maximum 1-hour mean concentrations varied from 1.4 ppm in 1997 to 1.6 ppm in 1996. Maximum 8-hour mean concentrations varied from 1.0 to 1.1 ppm, the lower value again occurring in 1997. This site recorded no exceedences of the CO standard. The 1997 maximum 1-hour and 8-hour means at Braidwood were lower than the corresponding statewide means of 5.4 ppm and 3.4 ppm, respectively.

Table 2-5. Concentrations of Carbon Monoxide (CO)
(in parts per million, ppm)

Station	Address		Highest value 1993	1994	1995	1996	1997
Braidwood	Com Ed Training Center	1-hour mean	---	---	---	1.6	1.4
	36400 S. Essex Rd.	8-hour mean	---	---	---	1.1	1.0

Note: There were no observed exceedences of the 1-hr primary standard of 35 ppm, or the 8-hr primary standard of 9 ppm. Measurements began at this site in 1996.

Table 2-6 shows annual mean concentrations of nitrogen dioxide (NO_2) at Braidwood for 1996-1997. The annual mean was 0.009 ppm in both years, well below both the primary standard of 0.053 ppm for annual mean NO_2 and the statewide mean of 0.024 ppm for 1997.

Table 2-6. Annual Mean Concentrations of Nitrogen Dioxide
(in parts per million, ppm)

Station	Address	1993	1994	1995	1996	1997
Braidwood (1630010)	Com Ed Training Center 36400 S. Essex Rd.	---	---	*	0.009	0.009

Note: An asterisk (*) indicates that data did not meet the minimum statistical selection criteria. There were no observed exceedences of the primary standard of 0.053 ppm at this station. Measurements began at this site in 1995.

Table 2-7 shows annual mean concentrations of lead (Pb) at the Pershing Elementary School in Joliet for 1993-1997. The annual means were quite constant over the period at 0.02 $\mu g/m^3$, except for the lower 1996 value of 0.01 $\mu g/m^3$. The 1997 annual mean was less than the statewide mean of 0.038 $\mu g/m^3$. There were no observed exceedences of the primary quarterly arithmetic mean of 1.5 $\mu g/m^3$ at this sampling site.

Table 2-7. Annual Mean Concentrations of Lead
(in micrograms per cubic meter, $\mu g/m^3$)

Station	Address	1993	1994	1995	1996	1997
Joliet	Pershing Elem. School Midland & Campbell Sts.	0.02	0.02	0.02	0.01	0.02

Note: There were no observed exceedences of the primary standard of a quarterly arithmetic mean of 1.5 $\mu g/m^3$ at this station.

Visibility

Visibility can serve as an index of the concentration of airborne fine particles, especially ammonium sulfate, although atmospheric humidity also affects the visibility to some extent. The poorer the visibility, the higher the concentration of fine particles. A report of the National Acid Precipitation Assessment Program (NAPAP, 1990) reviewed spatial and temporal variations in visibility in the United States. A map of spatial variations of visibility during the mid-1970s shows that central and northeastern Illinois had some of the poorest median midday airport visibility in the contiguous United States--about 10-11 miles. This contrasts with values of 20-45 miles in the Great Plains and values greater than 50 miles over most of the mountainous western United States.

The NAPAP (1990) report also documents seasonal and long-term temporal trends. In 1950, visibility in central and northeastern Illinois was worse in the first calendar quarter (roughly during winter) than during the rest of the year. By 1980, however, the situation had changed significantly: winter visibility stayed roughly constant, but spring, fall, and especially summer visibility had decreased substantially in central and northeastern Illinois and most of the eastern United States. These trends coincide with increased use of electric power for summer air conditioning and the trend at that time toward construction of tall stacks for dispersion of power plant plumes.

In addition, the NAPAP (1990) report documented the high correlation between sulfur emissions and haziness in the northeastern United States, and the trend toward decreasing sulfur emissions in the region since the 1970s. In view of the further reductions in sulfur emissions mandated by the 1990 Clean Air Act amendments, airborne fine sulfate concentrations should continue to trend downward, and this should translate into increased visibility in central Illinois in the future.

Air Pollutant Emissions Inventory

Table 2-8 presents estimated 1997 annual emissions of five criteria pollutants for DuPage and Will Counties in Illinois. Note that the DuPage River basin occupies less than a third of Will County, and would be upwind of the major industrial area around Joliet under typical prevailing wind directions from southwest through northwest. The estimated emissions are for stationary point sources only; they do not include emissions from

mobile or area sources. The table also shows the percentage of each pollutant's two-county total attributable to each county in 1997. Will County contributed more than 75% of the two-county total for all five pollutants, but most of these emissions would not be expected to impact the basin, since Will County would be expected to be downwind of most of the basin most of the time.

Table 2-8. Estimated 1997 Stationary Point Source Emissions in the Vicinity
(Source: Illinois Environmental Protection Agency, 1998)

	Particulate Matter		Sulfur Dioxide		Nitrogen Oxides		Volatile Organic Material		Carbon Monoxide	
County	T/yr	Pct	T/yr	Pct	T/yr	Pct	T/yr	Pct	T/yr	Pct
DuPage	798	11.0	440	0.6	1,782	3.6	2,251	24.7	857	12.7
Will	6,425	89.0	76,049	99.4	47,894	96.4	6,860	75.3	5,885	87.3
Total	7,223	100.0	76,489	100.0	49,676	100.0	9,111	100.0	6,742	100.0

Atmospheric Wet Deposition

Deposition of materials in precipitation (i.e., wet deposition) is measured routinely by the National Acid Deposition Program/National Trends Network (NADP/NTN) at many locations across the country. Two of these locations are in the vicinity of the DuPage River basin. NADP/NTN site IL-19 is at Argonne National Laboratory, at the eastern edge of the basin, and site IL-18 is at Shabbona, Illinois, about 50 km west of the basin. Measured major ion depositions and weighted mean concentrations at these sites for 1996 and 1997 are given in Table 2-9. The table also shows the precipitation amounts at each site for both years.

Concentrations of individual ions would generally be expected to be higher at both sites in 1997 than in 1996, based on the usual inverse relationship between concentration and precipitation amount. However, the usual relationship occurred in fewer than half the ions at both sites. Two-year weighted mean concentrations were higher at the Argonne site for Ca^{2+}, Mg^{2+}, Na^{+}, NH_4^{+}, NO_3^{-}, Cl^{-}, SO_4^{2-}, and H^{+}, and higher at the Shabbona site for K^{+}.

Deposition fluxes of all ions were higher in 1996 than 1997 at both sites (except Mg^{2+} at Argonne), mostly because of the greater precipitation in 1996. Two-year mean deposition was higher at Argonne for all ions except K^{+}. Two-year mean precipitation was about 20% higher at Argonne.

Table 2-9. Concentrations and Deposition of Major Ions in Precipitation near the DuPage River Basin
(Source: National Atmospheric Deposition Program, 1998)

Year	Ca	Mg	K	Na	NH4	NO3	Cl	SO4	H (lab)	pH (lab)	Precip (cm)
Argonne	**Concentrations (mg/L)**										
1996	0.28	0.056	0.023	0.123	0.55	1.71	0.20	2.32	0.0282	4.55	99.0
1997	0.31	0.070	0.021	0.097	0.43	1.72	0.20	2.29	0.0288	4.54	80.9
2-yr precip. wtd mean	0.29	0.062	0.022	0.111	0.50	1.71	0.20	2.31	0.0285	4.55	89.9
Shabbona											
1996	0.26	0.041	0.035	0.107	0.49	1.57	0.16	2.02	0.0251	4.60	86.6
1997	0.25	0.043	0.019	0.044	0.46	1.55	0.09	1.62	0.0209	4.68	62.6
2-yr precip. wtd mean	0.26	0.042	0.028	0.081	0.48	1.56	0.13	1.85	0.0233	4.63	74.6
Argonne	**Depositions (kg/ha)**										
1996	2.76	0.554	0.228	1.217	5.39	16.93	2.01	22.94	0.28	---	99.0
1997	2.54	0.564	0.170	0.782	3.50	13.88	1.59	18.53	0.24	---	80.9
2-yr mean deposition	2.65	0.559	0.199	1.000	4.45	15.41	1.80	20.74	0.26	--	89.9
Shabbona											
1996	2.28	0.36	0.30	0.93	4.21	13.56	1.37	17.46	0.22	---	86.6
1997	1.54	0.27	0.12	0.27	2.90	9.68	0.55	10.16	0.13	---	62.6
2-yr mean deposition	1.91	0.312	0.212	0.600	3.56	11.62	0.96	13.81	0.18	---	74.6

References

Illinois Environmental Protection Agency. 1994. 1993 Illinois Annual Air Quality Report. Illinois Environmental Protection Agency, Bureau of Air, P.O. Box 19276, Springfield, IL 62794-9276.

Illinois Environmental Protection Agency. 1995. 1994 Illinois Annual Air Quality Report. Illinois Environmental Protection Agency, Bureau of Air, P.O. Box 19276, Springfield, IL 62794-9276.

Illinois Environmental Protection Agency. 1996. 1995 Illinois Annual Air Quality Report. Illinois Environmental Protection Agency, Bureau of Air, P.O. Box 19276, Springfield, IL 62794-9276.

Illinois Environmental Protection Agency. 1997. 1996 Illinois Annual Air Quality Report. Illinois Environmental Protection Agency, Bureau of Air, P.O. Box 19276, Springfield, IL 62794-9276.

Illinois Environmental Protection Agency. 1998. 1997 Illinois Annual Air Quality Report. Illinois Environmental Protection Agency, Bureau of Air, P.O. Box 19276, Springfield, IL 62794-9276.

National Acid Precipitation Assessment Program. 1990. Acidic Deposition: State of Science and Technology Report 24, Visibility: Existing and Historical Conditions--Causes and Effects. National Acid Precipitation Assessment Program, Washington, D.C.

National Atmospheric Deposition Program (NRSP-3)/ National Trends Network. 1998. NADP Program Office, Illinois State Water Survey, 2204 Griffith Dr., Champaign IL 61820. Data retrieved from the NADP/NTN home page, http://nadp.sws.uiuc.edu, 11-9-98.

Surface Water Quality

The Illinois Pollution Control Board (IPCB) has set the water quality standards to protect the designated uses of the water resources in Illinois. The Illinois Environmental Protection Agency (IEPA) has developed scientifically-based water quality standards and proposed them to the IPCB for adoption into state rules and regulations (IEPA, 1990). Surface waters in Illinois are classified for a variety of designated uses which include:

- **General Use** – Provides for the protection of indigenous aquatic life, primary (e.g., swimming) and secondary (e.g., boating) contact recreation, agricultural and industrial uses. Water quality standards designed to protect these general uses cover the majority of Illinois streams and lakes.
- **Public and Food Processing Water Supplies** – Provides for the protection of potable water supplies and water used for food processing purposes. These waters have a somewhat strict set of water quality standards that apply at any point from which water is withdrawn for these uses.
- **Lake Michigan** – Provides for protection of Illinois' portion of Lake Michigan with even more stringent water quality standards.
- **Secondary Contact and Indigenous Aquatic Life Use** – This is the least stringent designated use and applies only to a certain set of canals and streams in the Chicago area where physical and other limitations not directly related to water quality restrict available uses.

Water quality can be examined and reported using several different methods. For example, it can be described according to the IEPA's overall use attainment or overall and individual use support, as discussed in the *Illinois Water Quality Report, 1998 Update* (IEPA, 1998a). Other approaches to assessing water quality include examining trends in water quality and the IEPA's Targeted Watershed Approach (TWA) program.

This chapter describes the surface water quality of rivers and streams, lakes, and watersheds in the DuPage River Assessment Area. Figure 2-1 shows rivers and streams in the assessment area.

Designated Use Support

For the surface water uses assessed in this report, the General Use standards for total phosphorus (TP) of 0.05 mg/L has been used. The TP standard has been established for the protection of aquatic life, primary-contact (e.g., swimming) and secondary-contact (e.g., boating) recreation, agriculture, and industrial uses. In addition, lake-use support is based in part on the amount of sediment, macrophytes, and algae in the lake and how

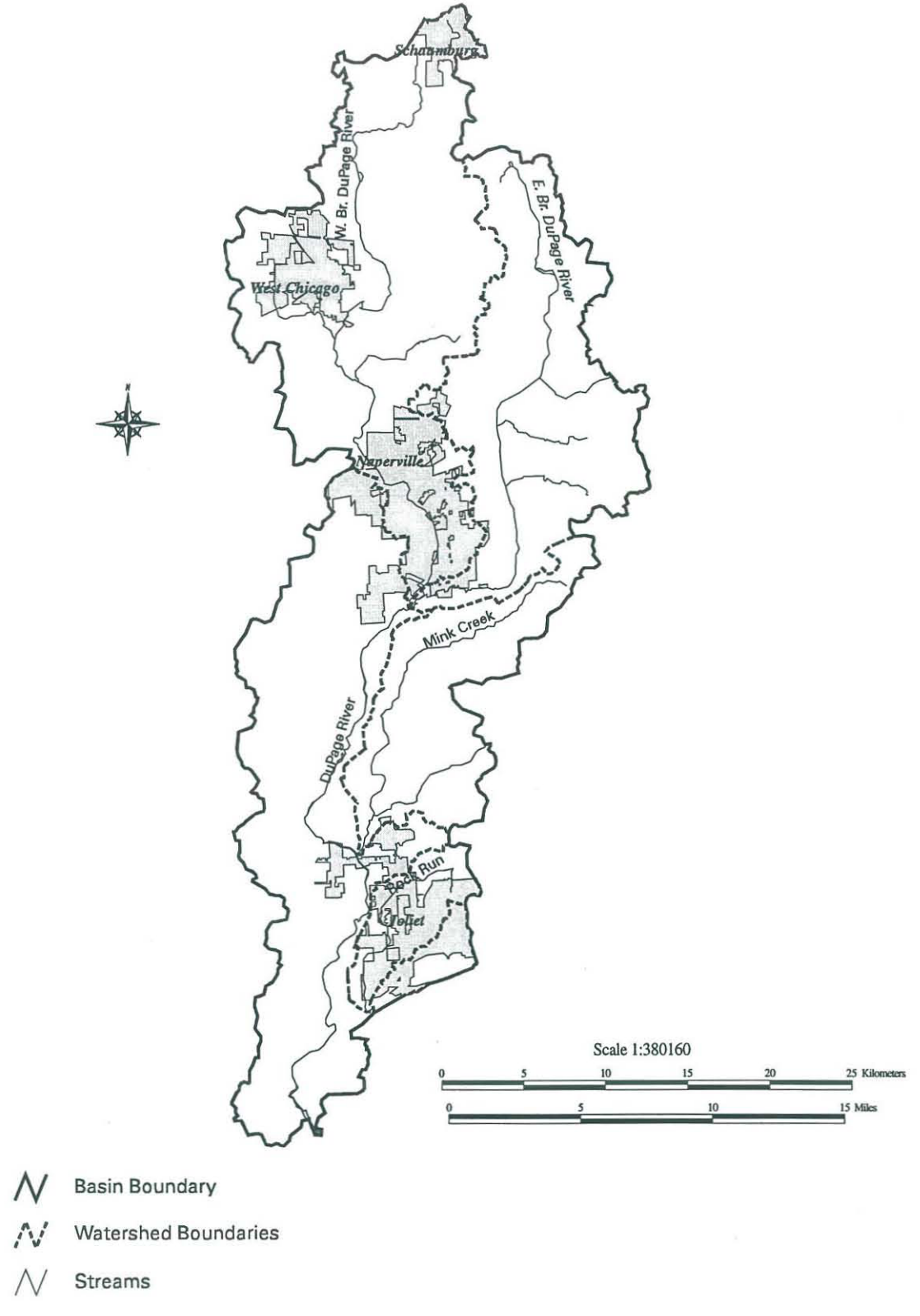


Figure 2-1. Major Streams and Subwatershed Boundaries in the DuPage River Assessment Area

these might impair designated lake uses. Following is a summary of the various classifications of use impairment (IEPA, 1998a):

- **Full Support** – The water quality meets the needs of all designated uses protected by applicable water quality standards.
- **Full Threatened** – The water quality is presently adequate to maintain designated uses, but if a declining trend continues, only partial support may be attained in the future.
- **Partial Support/Minor Impairment (Partial Minor)** – The water quality has been impaired, but only to a minor degree. There may be minor exceedences in applicable water quality standards or criteria for assessing the designated use attainment.
- **Partial Support/Moderate Impairment (Partial Moderate)** – Water quality conditions are impaired to a greater degree, inhibiting the waterbody from meeting all the needs for that designated use.
- **Non-Support** – The water quality is severely impaired and not capable of supporting the designated use to any degree.

Use support and level of attainment were determined for aquatic life, recreation, swimming, and overall surface water use, using methodologies described in the IEPA's *Illinois Water Quality Report, 1994-1995* (IEPA, 1996).

The assessment of swimming use for primary-contact recreation was based on available data using two criteria: 1) Secchi disc transparency depth data and 2) Carlson's TSI (Carlson, 1977). Finally, in addition to assessing individual aquatic life, recreation, and swimming uses, the overall use support of the lake or stream was also assessed.

Rivers and Streams

Waterbody specific information for rivers and streams in the DuPage River Assessment Area through 1996 is presented in the 1998 update report by the IEPA (1998a). Waterbody specific information includes subwatershed boundaries (see figure 2-2), year assessed, assessment level (monitored or evaluated), designated uses (overall use, fish consumption, aquatic life, swimming, secondary contact, and public water supply), and causes and sources of impairment.

Use Support

The DuPage River Assessment Area has a total of 437.2 river miles. Of these 437.2 river miles, 156.7 miles (35.84%) have been assessed by the IEPA up to the 1996 cycle. Table 2-10 shows the overall use support and swimming use for the rivers and streams assessed. Overall stream use was classified as full support for 41.4% of the streams, and other use supports for 58.6% of the river miles assessed. The IEPA (1998b) rated river and stream water quality in this watershed as of good and fair conditions.

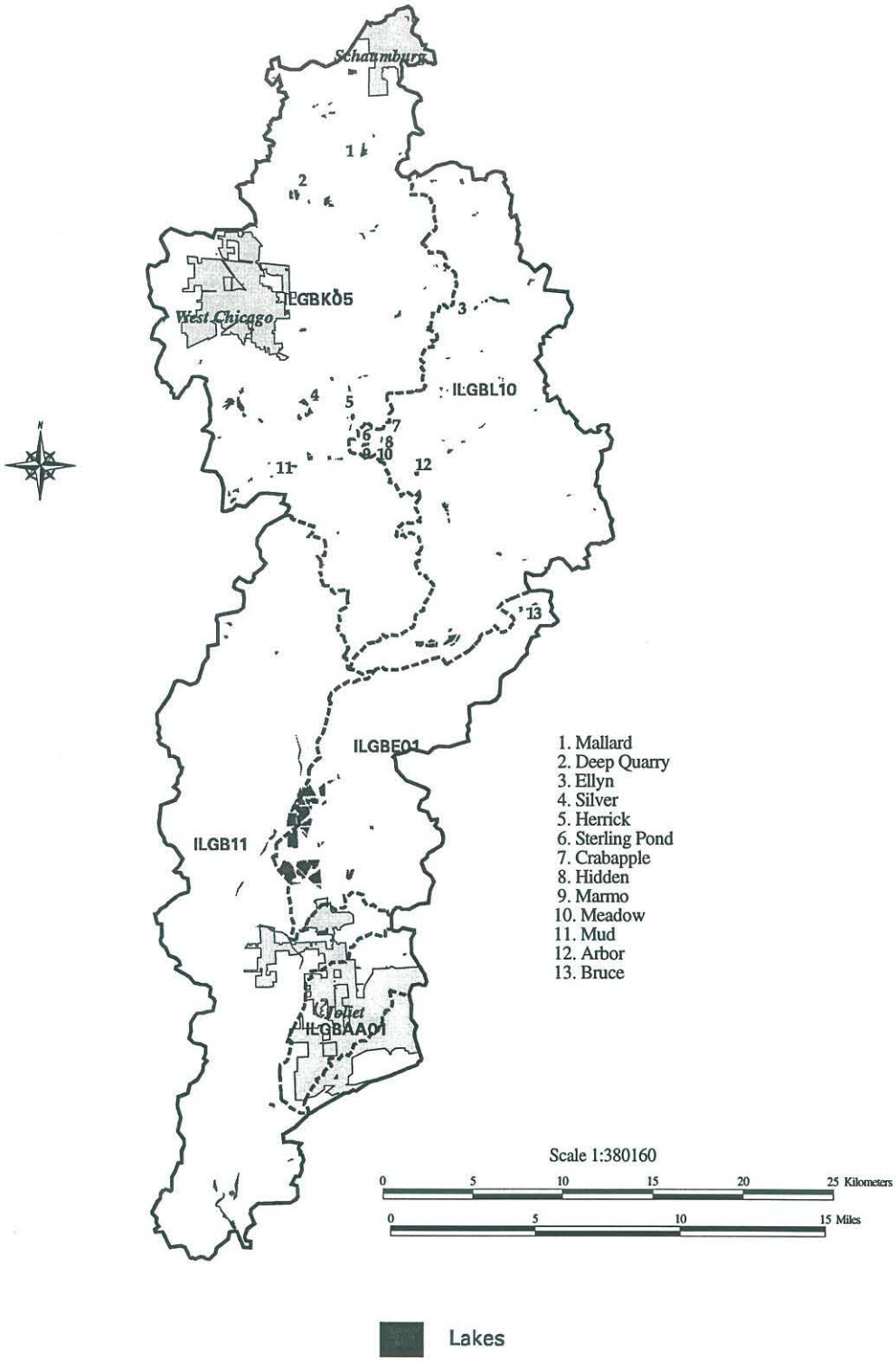


Figure 2-2. Lakes and Subwatershed Boundaries in the DuPage River Assessment Area

Table 2-10. Designated Use Support for Rivers and Streams in the DuPage River Assessment Area

	Overall uses*		Swimming	
Use support	River miles	Percent of assessed miles	River miles	Percent of assessed miles
Full	64.82	41.32	NA	NA
Partial/minor	77.63	49.54	NA	NA
Partial/moderate	10.68	6.82	19.04	12.15
Non-support	3.56	2.27	78.01	49.79
Not evaluated	NA	NA	59.64	38.06
Total	156.69	100.00	156.69	100.00

Note: *Aquatic life use support is exactly the same as overall use support.
NA indicates not applicable or available.

Fish consumption, aquatic life, and swimming use support for rivers and streams in the watershed were also assessed. However, fish consumption use support levels have not been recorded. Aquatic life use support for the rivers and streams was found to be exactly as that for overall use support (Table 2-10). In reviewing the individual use assessments, aquatic life use was considered the best indicator of overall stream conditions (IEPA, 1998a).

Causes and Sources of Less than Full Support

Table 2-11 shows the causes of use impairment for rivers and streams not fully supporting the designated uses. Not-fully-supporting causes include nutrients, siltation, habitat alternation, salinity/total dissolved solids/chloride, and ammonia.

Table 2-11. Causes of Use Impairment for Rivers and Streams in the DuPage River Assessment Area

	Impact, miles		
Cause category	High	Moderate	Minor
Priority organics	NA	NA	4.66
Metals	3.56	NA	18.86
Ammonia	NA	18.63	25.21
Chlorine	6.44	NA	10.08
Nutrients	69.41	4.26	11.97
Siltation	NA	53.22	NA
Organic enrichment/low dissolved oxygen	NA	4.26	9.72
Salinity/dissolved solids/chloride	22.10	8.14	14.91
Habitat alternation	27.78	36.64	NA
Pathogens	9.60	7.01	NA
Oil and grease	NA	3.92	NA
Suspended solids	NA	3.83	NA

Note: NA indicates not applicable or available.

Table 2-12 shows the sources of use impairment for rivers and streams in the DuPage River Assessment Area not fully supporting the designated uses. In addition, the table shows the magnitude of impairment for each source: high (H), moderate (M), slight (S), threatened (T), and none (N). The sources are mainly from municipal point sources, agricultural activities, hydrologic/habitat modifications, and urban runoff.

Additional water quality summary information for the river basin is available in a series of 33 fact sheets that can be obtained in the IEPA report (1996) and on the IEPA's homepage at www.epa.state.il.us/water/water-quality.

Trends in River and Stream Water Quality

Another way to examine water quality is through trends of physical, chemical, and biological characteristics from long-term data evaluation. The IEPA analyzed rivers and streams using the Seasonal Kendall trend analysis on selected ambient stream assessment stations throughout the state.

During the 14-year time span of Illinois EPA data collection at station ILGBL10, East Branch DuPage River near Leile (drainage area of 67 square miles), the majority of water quality parameters such as dissolved oxygen, total suspended solids, and total phosphorus showed no trend indicating stable conditions (IEPA, 1996). An increasing trend in pH units and nitrate/nitrite occurred at this station. Specific conductance and ammonia nitrogen showed downward trends.

Lakes and Reservoirs

There are 160 lakes covering a total area of 2,745.8 acres (ranging from 0.80 to 166 acres) in the DuPage River Assessment Area. Rivers, streams, and inland lakes are vital resources of a basin needed for economic and social well-being. Most public-owned lakes with 20 acres or more in surface area have been assessed by the IEPA's Volunteer Lake Monitoring Program. Of the 160 lakes in the assessment area, 14 (see figure 2-2) were assessed for the *Illinois Water Quality Report, 1998 Update* (IEPA, 1998a), however, the locations of Churchill Lagoon and Ellyn Lake are not available.

Use Support

Table 2-13 shows the overall use support for the three lakes studied in the assessment area. The IEPA (1996) used the aquatic life impairment index (ALI) and the recreation use impairment index (RUI) to arrive at these conclusions.

Overall use support ranged from full to partial/moderate. Overall use support for five of the lakes is full support.

Table 2-12. Sources of Use Impairment for Rivers and Streams in the DuPage River Assessment Area

River name (WBID-segment code) - miles	Muni.	Ag.	Nonir. crop prod.	Const.	Hwy./	Land Dev.	Urban Run.	Hydro./ mod.	Chan.	Dam const.	Flow reg.	Rem. veg,	Str. mod./ dest.
DuPage River (ILGB11-GB12) – 4.26	M	S	S	S	N	S	M	S	N	N	N	S	N
Rock Run (ILBGAA01) – 10.68	M	S	S	M	N	M	S	S	S	N	N	S	N
Lily Cache Creek (ILGBE01-GBE02) – 9.60	M	S	S	S	N	S	M	M	S	N	N	N	M
W. Br. DuPage River (ILGBK05-GBK01) – 3.92	M	N	N	M	N	M	M	S	S	N	N	N	S
W. Br. DuPage River (ILGBK05-GBK12) – 3.83	N	N	N	S	N	S	M	M	S	M	S	N	N
W. Br. DuPage River (ILGBK05-GBK07) – 6.35	M	S	S	M	S	M	S	S	S	N	N	S	N
W. Br. DuPage River (ILGBK05-GBK11) – 9.03	M	S	S	M	N	M	S	S	S	N	N	N	S
Spring Brook (ILGBK05-GBKA) – 2.41	N	S	N	N	N	N	S	N	N	N	N	N	N
Spring Brook (ILGBK05-GBKA01) – 3.56	H	N	N	N	N	N	N	N	N	N	N	N	N
Kress Creek (ILGBK05-GBKB01) – 7.31	N	S	N	N	N	N	S	N	N	N	N	N	N
E. Br. DuPage River (ILGBL10-GBL02) – 8.92	M	S	S	M	M	M	M	S	S	N	N	N	N
E. Br. DuPage River (ILGBL10-GBL05) – 3.18	M	N	N	M	M	M	M	S	S	N	N	S	N
E. Br. DuPage River (ILGBL10-GBL10) – 4.66	M	S	S	M	M	M	M	M	S	N	N	N	N
E. Br. DuPage River (ILGBL10-GBL08) – 6.44	M	N	N	M	M	M	M	M	M	N	N	S	N
E. Br. DuPage River (ILGBL10-GBL11) – 3.90	M	N	N	M	N	M	M	M	M	N	N	M	M
St. Joseph Creek (ILGBL10-GBLB) – 4.31	N	N	N	N	N	N	M	M	M	N	N	N	N
Lacey Creek (ILGBL10-GBLC) – 3.77	N	N	N	N	N	N	M	M	M	N	N	N	N

Note: WBID - waterbody identifier, Muni. - Municipal point sources, Ag. - Agriculture, Nonir. crop. prod. - Nonirrigated crop production, Const. – construction, Hwy./ - highway/road/bridge, Land. dev. – land development, Urban run. - urban runoff/storm sewers, Hydro./mod. – hydrological/habitat modification, Chan. – Channelization, Dam const. – dam construction, Flow reg. – flow regulation/modification, Rem. veg. – Removal of riparian vegetation, Str. mod./dest. – stream bank modification/destabilization, S – slight, M – moderate, H – high, N – not applicable or none.

Table 2-13. Use Support, Trophic State, and Water Quality Trends for Assessed Lakes
(Source: Illinois Environmental Protection Agency, 1998a)

	Use support							
Lake name – acres	Overall	Fish con-sumption	Aquatic life	Swimming	Recre-ational	TSI	Trophic state	Trends
Mallard – 80.0	F	NA	F	F	F	50	M	NA
Deep Quarry – 37.0	F	NA	F	F	F	45	M	NA
Silver – 56.9	F	NA	F	F	F	39	M	NA
Herrick – 20.5	T	F	F	R	R	63	E	Improving
Mud – 22.0	T	NA	F	F	D	59	E	NA
Sterling Pond – 2.1	R	F	F	R	D	67	E	Fluctuating
Marmo – 3.7	R	NA	F	R	D	66	E	Fluctuating
Hidden – 10.0	R	NA	F	N	R	70	E	NA
Meadow – 4.9	R	NA	T	T	D	78	H	Declining
Crabapple – 4.0	F	NA	F	F	F	52	E	Improving
Arbor – 14.7	F	NA	F	F	F	44	M	Fluctuating
Bruce – 14.6	R	NA	F	R	R	67	E	Fluctuating
Churchill Lagoon – 21.0	R	F	F	D	N	70	H	NA
Ellyn – 10.2	R	F	F	N	N	77	H	NA

Note: F – full support, T – full/threatened support, R – partial/minor support, D – partial/moderate support, N – nonsupport, NA – not assessed, M – mesotrophic state of lake trophic status, E – eutrophic, H – hypereutrophic.

The degree of use support was determined by individually assessing the aquatic life, recreation, swimming, and fish consumption use (Table 2-13). Full use support for aquatic life is found in 13 assessed lakes. For recreation use, five lakes are considered as full support, and two of the lakes (Churchill Lagoon and Ellyn Lake) are classified as non-support.

For swimming, six lakes are classified as full use support; while two of the lakes (Hidden Lake and Ellyn Lake) are found to be non-support. For fish consumption use, four of the lakes assessed are classified as full support.

Causes and Sources of Less than Full Support

Table 2-14 shows the causes of use impairment for the seven assessed lakes in the DuPage River Assessment Area "not fully supporting uses." The main causes are nutrients, siltation, organic enrichment/low dissolved oxygen, suspended solids, and noxious aquatic plants. In addition, the table shows the magnitude of impairment for each cause: threatened (T), high (H), moderate (M), slight (S), and none (N).

Table 2-14. Causes of Use Impairment for Lakes in the DuPage River Assessment Area
(Source: Illinois Environmental Protection Agency, 1998a)

Lake name	Pesticides	Nutrients	Siltation	Org./DO	SS	Nox. pt.
Herrick	N	T	T	T	T	N
Mud	N	T	N	T	T	T
Sterling Pond	N	M	H	H	H	M
Marmo	N	M	H	M	M	M
Hidden	N	H	M	M	H	H
Meadow	N	H	H	H	M	H
Bruce	S	H	H	H	M	M
Churchill Lagoon	N	H	H	N	H	M
Ellyn	N	M	H	S	H	H

Note: SS – suspended solids, Nox. pt. – noxious aquatic plants, N – not applicable.

Table 2-15 shows the sources of use impairment for the seven assessed lakes in the DuPage River Assessment Area "not fully supporting uses." In addition, the table shows the magnitude of impairment for each source: threatened (T), high (H), moderate (M), slight (S), and none (N). The major sources of lake impairments were due to agriculture especially nonirrigated crop production, contaminated sediment, construction, land development, urban runoff, lake shore erosion/stream bank modification, and hydromodifications.

Trophic Status

The trophic state index (TSI) and trophic state condition of the assessed lakes are also listed in the *Illinois Water Quality Report, 1998 Update* (IEPA, 1998a). The TSI values for lakes assessed ranged from 39 for Silver Lake to 78 for Meadow Lake (Table 2-13). Trophic state condition for four lakes is classified as mesotrophic, and that for three lakes are hypereutrophic. The other seven lakes are considered as eutrophic.

Trends in Lake Water Quality

The *Illinois Water Quality Report, 1998 Update* (IEPA, 1998a) shows that the trend in lake water quality for four lakes is fluctuating; that for Meadow Lake is declining, and for Herrick Lake and Crabapple Lake are improving (Table 13).

Targeted Watershed Approach

Water quality conditions can also be examined from a watershed perspective. The IEPA's watershed monitoring program is known as the Targeted Watershed Approach. Following is an excerpt from *GIS Technology Support for the Targeted Watershed Approach* by Sinclair et al. (1996).

"The Targeted Watershed Approach (TWA) was developed to established a framework for prioritizing Bureau of Water program activities with targeted watersheds..."

Table 2-15. Sources of Use Impairment for Lakes in DuPage River Assessment Area
(Source: Illinois Environmental Protection Agency, 1998a)

Lake name	Muni.	Ag.	Nonir. crop prod.	Const.	Hwy. const.	Land dev.	Urban run.	Land disp.	Sept. sys.	Hydro./ mod.	Chan.	Rem. veg.	Ero./ dest.	Atm. dep.	Cont. sed.	Nat- ural	Water- fowl	For./ park
Herrick	N	T	T	N	N	N	T	N	N	T	N	T	N	N	T	N	T	T
Mud	N	N	N	T	T	T	T	N	N	N	N	N	N	N	T	T	N	N
Sterling Pond	N	N	N	H	N	H	H	N	N	M	M	N	M	N	H	N	M	M
Marmo	N	N	N	N	N	H	H	N	N	M	M	N	M	N	H	N	S	M
Hidden	N	N	N	N	N	N	N	N	N	S	N	N	S	S	H	S	N	S
Meadow	N	N	N	N	N	N	M	N	N	S	N	N	S	N	N	N	N	N
Bruce	N	M	N	M	S	M	H	S	S	M	N	N	M	N	H	N	N	N
Churchill	H	N	N	S	N	S	H	S	S	M	N	N	M	N	H	N	N	N
Lagoon Ellyn	N	N	N	M	N	M	H	N	N	N	N	N	N	N	H	N	N	M

Note: Muni. – municipal point sources, Ag. – agriculture, Nonir. crop prod. – nonirrigated crop production, Const. – construction, Land dev. – land development, Urban run. – urban runoff/storm sewers, Land disp. – land disposal, Sept. sys. – septic systems, Hydro./mod. – hydrological/habitat modification, Chan. – channelization, Rem. veg. – Removal of riparian vegetation, Ero./dest. – lake shoreline erosion and/or stream bank modification/destabilization, Atm. dep. – atmospheric deposition, Cont. sed. – contaminated sediments, For./park – forest/grassland/parkland, T – threatened.

"The TWA was conceived and developed primarily to facilitate water quality management planning. Objectives for the utilization of this approach are:

- Identify watersheds with the most critical water quality problems and direct programs and resources to the solution of those problems.
- Direct programs and resources to those watersheds considered to have the highest potential for improvement based on the State's Biological Stream Characterization (BSC) process, and other factors.
- Protect existing high-quality water resources considered to be threatened (i.e., those waters displaying declining water quality trends but still fully supporting overall use attainment).
- Integrate point and nonpoint source programs activities."

For streams, the TWA has four watershed priority categories from highest (Priority 1) to lowest (Priority 4). Table 2-16 breaks down the four categories of prioritization in the TWA.

Table 2-16. Prioritization of Targeted Watersheds
(Source: Illinois EPA, 1997)

Category*	Criteria
Priority 1	– "A" rated streams based on BSC – Streams identified as "Threatened" in 305(b) – State Protected Streams – Streams with Full Drinking Water Use or SDWA MCL violations – 303(d) waters – Illinois Waterway upstream and inclusive of Lake Peoria
Priority 2	– Illinois Waterway downstream of Lake Peoria – Streams with high potential for improvement (Rank 1, 2, or 3 based on potential index of biotic integrity) – Partial Drinking Water Use Support Streams
Priority 3	– Streams with lower potential for improvement (Rank 4 or 5 based on potential index of biotic integrity)
Priority 4	– Streams with suspected nonpoint source impacts based on an evaluated level of assessment

Note: *Priorities 1-3 include point source impacts, combination point/ and nonpoint source, and nonpoint only, Priority 4 is nonpoint source only

There were four subwatersheds evaluated for TWA in the DuPage River Assessment Area, presented in Table 2-17. The Watershed identifier is as defined for each watershed in the *Illinois Water Quality Report* (IEPA, 1996). Priorities are as defined in Table 2-16, however, Priority 1.0 indicates that the area can be restored, while Priority 1.1 indicates the area can be prevented from impairment.

Three subwatersheds in the DuPage River Assessment Area are Priority 1.0 with nonpoint source impacts only. One watershed (ILGBK11) is Priority 3.

Table 2-17. Subwatersheds Evaluated for Targeted Watershed Approach
(Source: Illinois Environmental Protection Agency, 1997)

Subwatershed name	Watershed identifier	Priority	Source of impairment
Lily Cache Creek	GBE02	1.0	Nonpoint
West Branch DuPage River	GBK11	3.0	Nonpoint
West Branch DuPage River	GBK05	1.0	Nonpoint
East Branch DuPage River	GBL10	1.0	Nonpoint

References

Carlson, R.E. 1977. A Trophic State Index for Lakes. Limnology and Oceanography 22 (2): 361-369.

Illinois Environmental Protection Agency. 1990. Title 35: Environmental Protection, Subtitle C: Water Pollution. State of Illinois, Rules and Regulations, Springfield, IL.

Illinois Environmental Protection Agency. 1996. Illinois Water Quality Report 1994-1995. IEPA/BOW/96-060 a and b, Illinois Environmental Protection Agency, Springfield, IL.

Illinois Environmental Protection Agency. 1997. Targeted Watershed Approach – A Data Driven Prioritization. IEPA/BOW/97-004, Illinois Environmental Protection Agency, Springfield, IL.

Illinois Environmental Protection Agency. 1998a. Illinois Water Quality Report, 1998 Update. IEPA/BOW/98-014, Illinois Environmental Protection Agency, Springfield, IL, Aug. 1998.

Illinois Environmental Protection Agency. 1998b. The Condition of Illinois Water Resources 1998. IEPA/BOW/98-006, Illinois Environmental Protection Agency, Springfield, IL, Sept. 1998.

Kothandaraman, V. and R.L. Evans. 1983. Diagnostic-Feasibility Study of Lake Le-Aqua-Na. Illinois State Water Survey Contract Report 313, Peoria, IL.

Lin, S.D. and R. Raman. 1996. Phase III, Post-Restoration Monitoring of Lake Le-Aqua-Na. Illinois State Water Survey Contract Report 610, Champaign, IL.

Sinclair, R.A., B.R. Ward, and IEPA. 1996. GIS Technology Support for the Targeted Watershed Approach. Illinois State Water Survey Contract Report 600, Champaign, IL.

Hazardous and Toxic Waste Generation and Management

This section of the Area Assessment examines sites that may contain environmental contaminants, and manufacturing facilities that may emit pollutants. The aim of the report is to help major stakeholders develop goals and strategies for the use and protection of natural resources in areas where Ecosystem Partnerships have been formed.

The report draws upon the following environmental databases as resource material:

- Historical Hazards (HH)
- Surface Impoundment Inventory (SII)
- Landfills Database
- Superfund
- Toxics Release Inventory (TRI)

Assessment of Sites in the Region

Specific potential sources of waste generation and disposal in the DuPage Area are discussed below. See the map, Figures 2-3, for geographic locations of these sites.

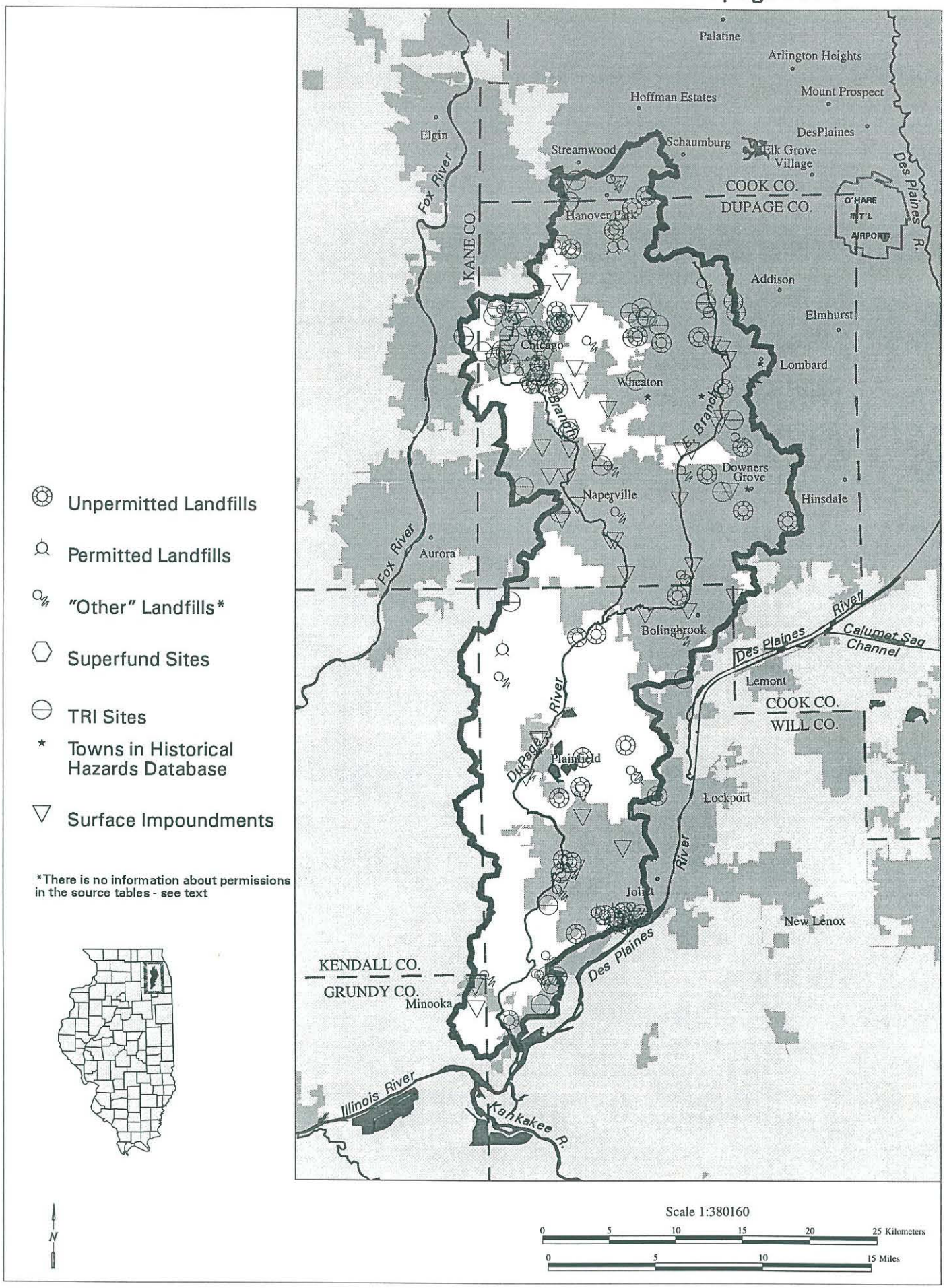
Historical Hazards Database

There are seven towns in the Area shown in the Historical Hazards database (see Table 2-18). Each of these towns historically contained one or more industrial facilities which might have been a source of pollutants, and which may or may not still be in operation.

Table 2-18. Historical Hazards Towns in the DuPage Area

Bartlett	Lombard	Wheaton
Downers Grove	Plainfield	
Glen Ellyn	West Chicago	

Figure 2-3. Sites of Possible Environmental Concern in the Dupage Area



Surface Impoundments Database

A surface impoundment is a lined or unlined lagoon used for the storage of liquids alone or mixed with solids, usually uncovered.

In the Area the Surface Impoundment Inventory shows 55 surface impoundment sites with a total of 104 impoundments. Of these sites, one is agricultural, 18 industrial, 36 municipal, and none mining.

Superfund Sites Database

There are eight Superfund sites in the Area (see Table 2-19) for 1996. Five of the sites are on the National Priority List (NPL).

Table 2-19. Superfund Sites in the DuPage Area

EPA ID	Site Name	City	NPL Status
ILD982643744	Crown Product	West Chicago	No
ILD980606305	Dupage County Ldfl/Blackwell Forest Pres	Warrenville	Final
ILD980823991	Kerr-McGee (Kress Creek/West Brand of Du	West Chicago	Final
ILD980824007	Kerr-McGee Reed Keppler Park	West Chicago	Final
ILD980824015	Kerr-McGee Residential Areas	West Chicago	Final
ILD980824031	Kerr-McGee Sewage Trmt Plt Site	West Chicago	Final
ILD005480686	Owens Illinois Plt #63	West Chicago	No
ILD072345242	White Septic Co	Bartlett	No

Landfills Database

Landfills have been by far the most common means of disposal for solid waste, though liquid wastes have also been landfilled. There are 83 landfills recorded in the Area — 10 permitted, 42 unpermitted and 31 "other." The "other" landfills have no information in the "permit" and "illegal" fields in the source tables.

TRI Database

The Toxics Release Inventory (TRI) covers year-by-year releases and transfers of chemicals by medium from manufacturing facilities to air, land, water, and underground injection. Transfers are of six types: to publically owned treatment works (POTWs), to treatment, to disposal, to recycling, to energy recovery, and to "other" facilities. Other information, most notably on pollution prevention, is also contained in the database.

There are 43 TRI facilities in the Area for 1996 (see Table 2-20). Illinois ranked 6th in the country for TRI total on- and off-site releases in 1996.

Table 2-20. TRI Facilities in the DuPage Area for 1996

A. P. Green Refractories Inc.	Dow Chemical*	OSI Ind. Inc.
Alumax Extrusions Inc.	E/M Corp.	Pierce & Stevens Corp.*
Aluminum Coil Anodizing Corp.	Gerlin Inc.	Polytech Industries Inc.
American Flange & Mfg. Co. Inc	Indl. Hard Chrome Ltd.	Rexam Release
Amoco Research Center	Inx Intl. Ink Co.*	Rodgers Eng. Corp.
ARI Ind. Inc.	J. L. Clark	Rovanco Piping Sys. Inc.
Babson Bros. Co.*	Kemlite Co. Inc.	Senior Flexonics Inc.
BASF Corp.*	Kraft Foods Inc.	Siemens-Furnas Controls
Battery Builders Inc.	Liquid Container L.P.	Spraying Sys. Co.
Blachford Inc.	Mapei Corp.*	Valspar Corp.*
Bulk Molding Compounds Inc.	Masonite Technical Center	Viktron
Camcraft Inc.	Metalstamp Inc.	Viktron L.P.
Chempet Corp.	Mobil Joliet Refinery	Webster-Hoff Corp.
Circuitronics L.L.C.	No-Sag Foam Prods. Corp.	
Davies Molding Co.	Odermath (USA) Inc.	

*Chemical Primary SIC Codes

The chemical industry, as defined by SIC (standard industrial classification) code, was the single largest emitter of TRI chemicals nationwide in 1996. Of the facilities with reported releases to any media in 1996, seven have chemical primary SIC codes listed.

Additional Information

See the *Headwaters Area Assessment, Volume 4* (DNR, 1997), and *Vermilion Area Assessment, Volume 4* (DNR, 1998) for more detailed information on the databases used in this report, and a list of contacts for further information. Alternatively, additional information can be obtained from WMRC Data Management at One East Hazelwood Drive, Champaign, IL 61820, telephone number 217-333-8940.

The reader is encouraged to review *The Changing Illinois Environment: Critical Trends, Volume 5* (ENR, 1994), which provides in-depth background information about waste generation and management trends in Illinois.

References

DNR, 1997. *Headwaters Area Assessment, Volume 4.* Illinois Department of Natural Resources.

DNR, 1998. *Vermilion Area Assessment, Volume 4.* Illinois Department of Natural Resources.

ENR, 1994. *The Changing Illinois Environment: Critical Trends, Volume 5: Waste Generation and Management.* Illinois Department of Energy and Natural Resources. ILENR/RE-EA-94/05(5).

PART III

ARCHAEOLOGICAL RESOURCES

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Archaeological Resources in the DuPage River Assessment Area

Illinois has long been the subject of archaeological research, especially in the major drainage systems. This research interest stemmed initially from recognition of a rich and complex record of human settlement and cultures in and near the major river valleys in the state. However, not all areas in the state have an equal distribution of known archaeological resources. It was recognized comparatively late in the history of archaeological research that the smaller stream valleys and surrounding uplands have an equally long and complex record of prehistoric and historic use as our major stream valleys, specifically the Illinois and Mississippi valleys. Study of cultural resources in the smaller river drainage areas can provide valuable information that may enhance and complement our knowledge of cultural developments within the state of Illinois.

Our knowledge of the prehistoric inhabitants of Illinois extends back at least 12,000 years. Records of prehistoric and historic occupations cover all time periods that are recognized in the state (see Table 3-1). In the process of constructing this framework, archaeologists have developed and contributed to a still-growing body of knowledge about human culture and earth history. In our present framework, Illinois culture history has been divided into a series of temporal periods. Each period is associated with fundamentally different cultures and ways of life, as indicated by the material culture or artifacts that are the signatures of these past cultures. As the temporal distance between the present and past cultures becomes less remote, there are more opportunities to learn about other aspects of past lifeways. Consequently, our understanding of historic cultures (dating after the time of initial European contact with Native Americans) is more detailed than that of any prehistoric period; our understanding of late prehistoric Mississippian cultures, though admittedly incomplete, is more comprehensive than for time periods in the more remote past (Paleo-Indian, Archaic and Woodland periods) in this region. Using interdisciplinary and evolutionary approaches, archaeological research has also contributed to our current understanding of past climates, plant and animal communities, and landscapes. The following is brief discussion of the framework presented in Table 3-1.

The best evidence for the earliest occupants of Illinois is that left by people archaeologists refer to as Paleo-Indians. The Paleo-Indian period corresponds to an environment influenced by the Wisconsinan glaciation, in which the climate was cooler, wetter, and more severe than that of today. Paleo-Indians hunted the large, now-extinct mammoth and mastodon, but they undoubtedly exploited a wide range of plant and animal species during their seasonal rounds. Evidence for occupation often consists of finely crafted dart or spear points. Few Paleo-Indian habitation sites are known for Illinois, and even fewer have been excavated.

Table 3-1. Chronological Framework for Illinois Culture History.

Period	Subperiod	Calendar Years (Dates indicate beginning of period)
Historic	Postwar	A.D. 1946
	Urban Industrial	A.D. 1901
	Early Industrial	A.D. 1871
	Frontier	A.D. 1841
	Pioneer	A.D. 1781
	Colonial	A.D. 1650
	Native American	A.D. 1650
	Unidentified	A.D. ????
Protohistoric		A.D. 1500
Upper Mississippian	Oneota	A.D. 1400
Middle Mississippian		A.D. 900
Woodland	Late Woodland	A.D. 300
	Middle Woodland	200 B.C.
	Early Woodland	1000 B.C.
Archaic	Late Archaic	3000 B.C.
	Middle Archaic	6000 B.C.
	Early Archaic	8000 B.C.
Paleo-Indian		10000 B.C.
Prehistoric	Indeterminate	

Following the retreat of the glaciers to the north, a warmer climate was established in the mid-continent. Coniferous forests were replaced by temperate deciduous forests that supported a modern spectrum of fauna and a broader range of food resources. Most important to Archaic subsistence, this rich deciduous forest environment provided nuts, small game, and white-tailed deer.

Early Archaic populations continued to maintain a mobile hunter-gatherer subsistence and settlement pattern, but there is evidence for increasing regionalization of populations in the form of more geographically variable suites of artifacts. Early Archaic habitation sites are much more numerous than those of the preceding Paleo-Indian period. While many Early Archaic sites are small and represent the remains of temporary camps, some extensive sites with dense artifact concentrations suggest a trend toward more long-term or repeated use of favored locations.

The Middle Archaic subperiod corresponds to another interval with a characteristic climatic signature. Between about 8,000 and 4,000 years ago, the Hypsithermal climatic interval was generally characterized by climatic conditions that were significantly warmer and drier than the preceding Early Archaic period or, for that matter, of the modern climatic regime. In many areas, these warmer and drier conditions affected local environments, resulting in increased upland erosion, increased flood plain deposition, lowered water tables in upland areas, more precise zonal vegetation distributions and, most importantly, spread of the prairie into many upland environments in the state. Human responses to these new environmental conditions were highly variable, but there appears to have been a general increase in populations inhabiting the major river valleys and immediately adjacent uplands. In some areas there is evidence for less intensive use of upland environments located farther from permanent streams. Even though a hunting and gathering lifeway was maintained, settlement practices were organized differently, and long-term habitation sites served as bases from which people embarked on hunting and gathering trips into upland or other settings for the purpose of acquiring specific types of resources.

Throughout Eastern North America after the Hypsithermal and during the Late Archaic subperiod, there was a period of increased sedentism and apparent population growth. The trend in settlement systems toward longer-term occupations was intensified, resulting in increased regionalization and more intensive exploitation of locally abundant plant and animal resources. The Late Archaic period contains the first evidence of cultivation and domestication of plants. Specialized mortuary treatments, such as construction of burial mounds and the presence of exotic trade items, illustrate the strengthening of social networks and development of increasingly complex political systems. The higher population density in and near the larger stream valleys is one factor that promoted development of more intensive methods of resource extraction, smaller social territories, increased regional interaction through systems of long-distance exchange, and more complex social and political hierarchies. All of these developments have their genesis either in the Middle or Late Archaic subperiods and are more fully expressed in later times. In addition, these trends are also evident in areas remote from the major stream valleys, suggesting that these broad cultural and organizational changes affected the entire Midwestern region.

Pottery vessels are a hallmark of the Woodland period. During the Early Woodland subperiod the central Mississippi River valley and surrounding regions saw the introduction of pottery containers and cooking vessels. This was a major change in technology, but the overall hunting-gathering lifeway that characterized the Archaic period generally continued into the Early Woodland with little change. However, native plant cultigens appear with increasing frequency and abundance. Burial mounds often account for a high proportion of Early Woodland sites if only because they are prominent features on the landscape, while Early Woodland habitation sites generally are small or mixed with materials from other time periods. When distinctively shaped mounds attributable to the Early Woodland period are absent in a region, sites of this time period are often poorly represented numerically.

The Middle Woodland subperiod corresponds to a time of increased complexity in social and political organization. There is abundant evidence for long-distance exchange of exotic raw materials and finished artifacts, development of distinctive and elaborate artifact styles, and elaborate mortuary ceremonialism. These characteristics are especially well-expressed near the Middle Woodland burial mound centers in the central Illinois River valley and in the Scioto River valley of Ohio. There are fewer Middle Woodland sites in the DuPage River drainage area, but even so, there is evidence that this region was integrated into a pan-regional Middle Woodland ceremonial/ideological interaction network called Hopewell by archaeologists. The region was not intensively occupied by Middle Woodland groups.

During the Late Woodland, there were intensifications and continuations of many of the trends that began as early as the Archaic period, including increasing use of aquatic resources, intensive harvesting of cultivated plants (which now include both tropical [corn] and native [e.g., maygrass, knotweed, sunflower, and goosefoot] cultigens), regional expression of artifact styles, population growth, and increased social and political complexity. During this time, there is evidence in most regions that numerous small sites are located on all landforms, including upland areas remote from streams. This dispersal has been attributed to a variety of factors, including breakdown of the integrative effects of the Hopewell culture, introduction of corn as an agricultural crop, and development of the bow and arrow, a new and much more efficient technology for hunting and defense. However, there is also a decrease in the apparent degree of mortuary ceremonialism, less exchange of exotic materials, and less elaboration of artifact styles compared to the Middle Woodland subperiod. In spite of the apparent lower degree of ceremonial elaboration, complex social and political interactions were taking place during the Late Woodland subperiod, including much interregional contact and, apparently, movement of relatively large numbers of people. These social and political changes set the stage for development of the more complex Middle Mississippian period.

The Middle Mississippian period witnessed development of socially and economically complex societies. There is strong emphasis on cultivated crops, especially corn, squash, and a variety of native plants that are now considered to be weeds (e.g., goosefoot, knotweed, marsh elder). A powerful elite social class oversaw construction of monumental public works projects, including plazas and large earthen mounds in the center of larger towns. Middle Mississippian culture spread throughout the Mississippi River valley and its tributaries and into the southeastern United States. Artistic styles and cultural materials associated with the Mississippian tradition are found in virtually all portions of the state and throughout the Southeast. This cultural adaptation affected many people located well outside the Middle Mississippian cultural heartland in the central Mississippi River valley.

In Illinois, the elaborate social and ritual complexity of Middle Mississippian culture was replaced by less elaborate Upper Mississippian cultures in the 14th through 16th centuries AD. Upper Mississippian sites in Illinois are generally associated with one or more regional expressions of Oneota culture. In the DuPage River Assessment Area (DRAA), the local (not Oneota) Upper Mississippian manifestation is known as the Langford culture. Langford sites are

relatively common here compared to other regions in the state. Upper Mississippian societies apparently lacked the strong hierarchical structure of Middle Mississippian cultures, but still relied heavily on corn horticulture as a subsistence staple.

Protohistoric period sites are poorly documented in many regions, and the DuPage River Assessment Area is no exception. Most sites of this time period are identified either through historic accounts, oral traditions of Native American groups, or the occurrence of European trade goods in an otherwise aboriginal artifact assemblage. At some sites, we see the influence of Europeans prior to their physical arrival within a region and prior to historic documentation of European settlement. Most sites of this time period appear to be concentrated in major river valleys, but there is some indication of dispersed communities in upland and small valley settings.

The arrival of the French in the late 17th century provides the first written accounts of Native American lifeways in Illinois. With this record comes the identification of specific Native American tribes and more detailed documentation of everyday life. The best documented historic era Native American sites in the state are those known from historic accounts. However, such accounts are scanty, and only a few sites described or mentioned in the literature have been matched to specific locations. Still, historic accounts as well as oral traditions of Native American groups establish that various tribes were present in the Dupage River region in the 17th to the early 19th centuries. One tribal group that is known to have inhabited the DuPage River region is the Mascouten (Goddard 1978). Sauk, Fox, and Kickapoo groups are also known to have moved through the region briefly during the 18th century (Bauxar 1978). The Prairie Potawatomi settled in the area in the late 1700s until their eventual removal west in 1832 (Clifton 1978). Historic Native American sites are generally rare but, when located, provide important information on lifeways that were in rapid transition as a result of cultural contact and conflict.

The area was settled by Euro-Americans by the nineteenth century, although it had been actively traversed since the 1600's by traders, missionaries, and explorers. A fur trading post was established on the confluence of the East and West Branches of the Dupage River in the 1780's. It was built by Dupage and was called "The Forks", "Valley of Fountaindale", and "Fountainelle" for the location at the branch of the Dupage and for the numerous springs in the area (Bird 1995).

Historical documents also provide information about European and Euro-American lifeways on the expanding western frontier. Few sites are recognized for the Colonial Historic subperiod. However, increasing European and Euro-American influences and settlement provided more material remains, and sites associated with later Historic Pioneer and Frontier subperiods are consequently better known. The increasing Euro-American presence also resulted in greater conflicts between Native Americans and European settlers. The conflicts culminated in the early 19th century with the Black Hawk War and the Battle of Tippecanoe (Indiana), after which tribes were required to move west across the Mississippi River. By the beginning of the Historic Frontier subperiod, Native American settlements in Illinois are generally absent, and Euro-

American settlers spread throughout the state.

The next several historic subperiods (Early Industrial, Urban Industrial, and Post War) witnessed immense changes in technology, political organization, and economic relationships across the state as well as within the area. The presence of a rich historic-era archaeological record in this region aids our understanding of social forces and historical processes. Within the DRAA, the most significant and continued impact on regional historical settlement trends has been the growth and development of the Chicago metropolitan area and its associated economic and transport corridors. Written history does not adequately record many aspects of daily life, but often instead focus on singular events or persons. We have learned that archaeological investigations can provide insights into past cultural behavior that supplement and expand the written historic records. Increasingly, archaeologists are exploring the combined written and material record of the past two centuries to provide a more comprehensive interpretation of human history, including both Native American and Euro-American cultures.

Archaeological Resources of the DuPage River Assessment Area

The DuPage River Assessment Area (DRAA) consists of approximately 965 square kilometers. The drainage system covers most of DuPage County, the northwestern portion of Will County, a small area in northeastern Grundy County, a sliver along the eastern edge of Kendall County, a small portion of central eastern Kane County, and the southern middle section of the upper western portion of Cook County. This watershed area is average in size compared to the other assessment areas in the state for which archaeological summaries have been compiled. The overall area that has been systematically surveyed is 59.51 km² (about 13.2%). Of the total surveyed area, 16.8 km² (28.2%) was a 1970 National Accelerator Laboratory survey in DuPage and Kane Counties.

The area has a total of 740 archaeological sites (as of March 31, 1999). The site density is very high at 0.77 sites/km²; this high density is probably due to the relatively greater proportion of the DRAA that has received systematic intensive survey in recent years. In the past the DRAA region has been overlooked, with systematic archaeological research concentrating more on neighboring localities, the Des Plaines and Fox Rivers. But as the urban sprawl of Chicago infiltrated the DRAA's boundaries, the hidden prehistory of the area became evident. A brief synopsis of the history of archaeological research in the watershed sets the stage for a summary of the archaeological resources.

Historical Considerations

When compared with most other regions in Illinois, archaeologists have conducted a comparatively large amount of work in the DRAA. Most of this work stems largely from

requirements for compliance with Federal and State cultural resource management laws that may require survey, or in some cases excavation, of sites affected by development and construction projects. Virtually all of the research to date has consisted of documenting sites through systematic and nonsystematic surveys. One factor affecting our current state of understanding of archaeological research is that not all watershed regions have received equal attention. Even within a single watershed region, both industrial development and archaeological research interests–two major factors that provide impetus to study of cultural resources–have waxed and waned over time. The record of archaeological research in the DRAA largely reflects the impact of Federally-mandated cultural resource management (CRM) studies that post-date 1970. The continuing metropolitan expansion of Chicago and its suburbs has resulted in documentation of numerous sites in the DRAA. The DRAA has proven to be a region rich in archaeological resources that has provided information on a variety of research issues and has the potential to contribute in the future to our understanding of the past.

Chicago and surrounding areas, including the DRAA, was first investigated through nonsystematic surveys by two amateur archaeologists, Charles Dilg and Albert Scharf. Both men documented information on mounds, trails, and village sites throughout the area. While their work contains some speculative theory, it also paints a picture of the DRAA region before urban sprawl erased the natural landscape. Scharf also recorded interviews with the older generations who had first hand knowledge of the Native American activities in the region before they were forced from their homeland across the Mississippi River. Though their work was never published, their manuscripts are maintained by the Chicago Historical Society and provide a valuable research resource (Markman 1991).

During the 1950's and 1960's, archaeologists David J. Wenner and Sanford H. Gates actively surveyed Chicago and the surrounding area. Sanford H. Gates specifically evaluated the DuPage River Assessment Area in 1958, discovering the area to be rich in all temporal periods from the Paleo-Indian to the present (Gates 1961).

In 1970 an intensive systematic survey was undertaken by Ann M. Early and her field team on the property of the National Accelerator Laboratory (NAL). They covered over 16.8 km^2 of land in both Kane and DuPage counties. They recorded 24 new sites with Archaic, Woodland, Mississippian, and Historic components. Analysis was also made of private collections that had been gathered from the area.

After implementation of funding methods for Federal CRM legislation in 1974, archaeological information from the region increased significantly, especially areas affected by development. These laws often require archaeological surveys or site evaluations of areas affected by construction projects, and the expansion of metropolitan Chicago and its suburbs in the surrounding "collar counties" has resulted in considerable growth in the archaeological data base. Even though there has been considerable survey in the DRAA, few of the reported sites have been formally tested or subjected to large-scale excavation. The vast majority of our information about the archaeology of the DRAA comes from survey and site distribution data.

Summary of Archaeological Resources

The following summary is based on the data contained in the state files maintained at the Illinois State Museum (as of 31 March 1999). A total of 740 archaeological sites are recorded in the watershed (Figure 3-2). Several of the sites contain multiple cultural components representing recognizably different periods of site occupation or use. The total number of components reported is 1049 (Table 3-2). Reported sites range in age from the Paleo-Indian through the Historic Post-War periods, with only the Historic Native American and Historic Colonial subperiods not represented in the current site sample. The sites are distributed throughout the watershed, but as a comparison of Figures 3-1 and 3-2 shows, they are concentrated along the DuPage River and in the central portion of the watershed.

Almost a third of the sites in the watershed (324 or 30.9 percent of reported sites) produced artifacts that could not be assigned to a specific temporal period (Figure 3-3). These are designated sites of unknown prehistoric cultural affiliation. These sites appear to be concentrated along the DuPage River, but are found throughout the DRAA.

A small number of sites in the watershed (9 or 0.9 percent of reported sites) have been deemed Paleo-Indian (Figure 3-4). While two of these sites occur along the banks of the DuPage, the other seven are found in the upland or bluff areas of the watershed. There might be more Paleo-Indian sites along the river bank and in the flood plain but, if so, they are likely buried by later Holocene alluvial deposits.

Archaic (Figure 3-5) period sites that could not be assigned a specific subperiod (Early, Middle, or Late Archaic) account for 38 (3.6 percent) of the reported sites. These sites occur in roughly the same areas as the Paleo-Indian sites as well as in the southern portion of the watershed area. Many sites of this time period were reported early in the history of archaeological research in this region, when Archaic subperiods were often not differentiated in site reports.

As seen in Figure 3-6, Early Archaic sites are beginning to appear in the upland areas, although there are still several along the banks of the DuPage River. Sites assigned to this subperiod represent 4.5 percent (n=47) of the total number of sites reported in the DRAA. As with the Paleo-Indian sites, there could be more in the flood plain, buried by Holocene alluvial deposits.

There are 25 sites (2.4 percent) with Middle Archaic components (Figure 3-7). The decrease in Middle Archaic sites is a phenomenon repeated in many of the watershed areas of the state. The warmer, dryer climate brought on by the Hypsithermal appears to have caused the populations of the Middle Archaic to relocate near permanent water sources (Markman 1991). It is possible that there are Middle Archaic sites located within the flood plain; these have also been buried in late Holocene alluvium.

Table 3-2. Archaeological Resources in the DuPage River Assessment Area.

Period	Subperiod	Calendar Years (Dates indicate beginning of period)	Number of Components
Historic	Postwar	A.D. 1946	72
	Urban Industrial	A.D. 1901	87
	Early Industrial	A.D. 1871	77
	Frontier	A.D. 1841	58
	Pioneer	A.D. 1781	5
	Colonial	A.D. 1650	0
	Native American	A.D. 1650	0
	Unidentified	A.D. ????	166
Protohistoric		A.D. 1500	2
Upper Mississippian	Langford/Fisher/Huber	A.D. 1400	6
Middle Mississippian		A.D. 900	21
Woodland	Late Woodland	A.D. 300	23
	Middle Woodland	200 B.C.	23
	Early Woodland	1000 B.C.	8
	Unidentified	1000 B.C.	14
Archaic	Late Archaic	3000 B.C.	44
	Middle Archaic	6000 B.C.	25
	Early Archaic	8000 B.C.	47
	Unidentified	8000 B.C.	38
Paleo-Indian		10000 B.C.	9
Prehistoric	Indeterminate	10000 B.C.	324
Total components			1049
Total sites			740

The Late Archaic (Figure 3-8) subperiod accounts for 44 (4.2 percent) of the sites recorded in the watershed. Approximately a quarter of all the Late Archaic sites are found along the river and in the flood plain, the remainder occur in the uplands and on bluffs. The tendency towards upland

relocation could be due to the increased resources of the savanna and prairie brought about by the cooler and more moist climate that followed the Hypsithermal. Temporal subperiods from the Late Archaic on are more likely to be exposed at the surface in stream and river valleys and more easily found during surveys.

There are 14 sites (1.3 percent) that are classified as unidentified Woodland (Figure 3-9). These are sites that produce artifacts that have distinct Woodland attributes, but cannot be grouped into a subperiod. As with unidentified Archaic, many of these sites were located by early researchers or amateur archaeologists.

The progression from Late Archaic to Early Woodland is marked by the introduction of pottery. Lithic tools of this subperiod have primarily the same characteristics as those from Late Archaic sites; therefore, pottery is the determining factor differentiating these types of sites. Unfortunately, because Early Woodland pottery is poorly fired, it has a tendency to break and virtually disappear, making it difficult to identify and separate Late Archaic and Early Woodland sites. This may be the reason for the low accounting of Early Woodland (Figure 3-10) sites (n=8, 0.8 percent).

Middle Woodland sites (Figure 3-11) are much more numerous than the previous subperiod with 23 sites (2.2 percent). Distinctly decorated pottery and conical mounds differentiate Early and Middle Woodland subperiods. In the DRAA, the majority of Middle Woodland sites occur along the river. There are relatively few sites in the uplands.

The number of sites in the Late Woodland subperiod is the same as the Middle Woodland, again 23 sites (2.2 percent). Figure 3-12 shows the distribution of the upland and flood plain sites to be similar to that of the Middle Woodland. In most of the other watershed areas in the state, there has been an increase in the number and a wider dispersal of Late Woodland sites.

Middle Mississippian (Figure 3-13) components decrease slightly (n=21, 2.0 percent). Contrary to other watershed areas within the state, the Middle Mississippian sites of the DRAA tend to be in upland and bluff areas rather than along the river valley.

Upper Mississippian (Figure 3-14) sites decrease sharply (n=6, 0.6 percent). Because many of the characteristic artifacts of the Upper Mississippian are similar to those of the Middle Mississippian, they can be difficult to tell apart. Therefore, there could be several sites having an Upper Mississippian component, but they have not been recognized. In the 1970 National Accelerator Laboratory survey, Ann M. Early discovered several Upper Mississippian sites of the Langford tradition, but at the time sites of this subperiod were simply termed Mississippian.

Only two sites (0.2 percent) have been recorded as having Protohistoric components (Figure 3-15). Protohistoric sites are difficult to differentiate from Middle and Upper Mississippian sites. It is probable that there are more Protohistoric sites in the DRAA region, but these have yet to be identified. One Protohistoric site that has been researched is "Vermouth's Claim" which was

located in Walker's Grove, later named Plainfield (Bird 1995). This site also has Middle Woodland, Mississippian and several Historic components.

Historic component sites account for 465 (44.3 percent) of the recorded sites and 62.8 percent of all the components. Sites that could not be assigned to a specific Historic component (Figure 3-16) total 15.8 percent (n=166) of all of the recorded sites.

There are several native American tribal groups that were known to have inhabited the DRAA region from the 17th to early 19th centuries, yet no Historic Native American (Figure 3-17) sites have been recorded. The span of this temporal subperiod is relatively short in comparison to others. Many tribes were relatively mobile; therefore, it is not surprising that sites of this period are extremely difficult to locate. Colonial Period (Figure 3-18) sites have yet to be discovered in the DRAA region.

There are only five (0.5 percent) sites that contain the Historic Pioneer (Figure 3-19) subperiod component in the DRAA region. All of these sites are multicomponent, showing evidence of later occupation.

Historic Frontier (Figure 3-20) components are evident in 58 (5.5 percent) sites. Many of these sites appear to be clustered around the city of Plainfield and in the uplands along the West Branch of the DuPage River.

Most sites are classified in later Historic subperiod: Historic Early Industrial (n=77 or 7.3 percent), Historic Urban Industrial (n=87 or 8.3 percent), and Historic Postwar sites (n=72 or 6.9 percent) are located in primarily the same areas as Historic Frontier sites. The area in and around Plainfield appears to have been utilized early on, as well as the upland area between the Fox and DuPage rivers. Many of these historic sites are multicomponent, denoting continued use of residences or businesses.

Summary

The patterns of site distribution may be biased by uneven survey coverage within the watershed region as well as the research interests of researchers investigating specific temporal periods. There has been much more intensive survey coverage of selected tracts, such as pipeline rights-of-way, housing developments, and the National Accelerator Laboratory area. Despite these uneven distributions, wherever intensive systematic survey of large contiguous tracts has been undertaken within the watershed, both prehistoric and historic sites have been located.

Little formal analysis has been conducted on the prehistoric site distribution data, but patterns of site frequency change through time suggest some long-term trends in patterns of land use within the DRAA. Much of the fluctuation in prehistoric settlement patterns observed in this and nearby regions has been linked either directly or indirectly to climatic variations, in particular the impact of the warm, dry Hypsithermal interval during the Middle Archaic period. It was during

this period that prairies became established in central Illinois; human subsistence and settlement systems appear to have adjusted to these changed environmental and social conditions. The present data, while not formally analyzed, suggest that similar patterns of land use trends occurred in the DRAA. A second long-term trend that is apparent in these data is that beginning in the Late Archaic period and continuing through the latest prehistoric period, there is a strong emphasis on settlement along or near larger and more permanent stream valleys. Sites in upland areas are severely under-represented, especially when compared to the distribution of sites for the Early Archaic period. This trend has been linked to both the increased importance of aquatic resources and to increasing reliance on cultivated crops during the Woodland and later time periods.

Examination of the composite site distribution of all sites documented in the DRAA (Figure 3-2) compared to specific temporal periods suggests possible avenues for future investigation. Gross correlations may be made between site locations and specific environmental parameters such as distance to permanent surface water, economic centers, transportation corridors, etc., that are assumed to be of importance to either historic or prehistoric occupants of the area. These types of general analyses may lay the ground work for more specific predictive models for site locations or other types of settlement system analyses. The region was probably continuously occupied for the last 12,000 years, in spite of major changes in both social and physical environments over this time span. The only possible exception to this observation is the Historic Colonial subperiod dating between A.D. 1650 and 1780. In addition, several of the sites identified as Mississippian may have Upper Mississippian or Protohistoric components as well; these latter subperiods are not well represented in the DRAA or surrounding regions. Low incidence of sites assigned to post-Middle Mississippian periods is more likely the result of our current inability to positively identify sites of this time span than the result of a true absence of inhabitants in this region.

The high density of sites recorded in some of the pipeline corridors that cross upland and flood plain environments suggests that there is considerable potential for encountering large numbers of archaeological sites of virtually all time periods when survey is systematically conducted over large contiguous tracts. Finally, this region, like others in the state, has been subjected to differential use and modification through time. Because of differences in hunter-gatherer versus later horticultural/agricultural adaptive strategies and extant environmental conditions, Early and Late Archaic period sites are more likely to be found in upland settings away from permanent streams than are Woodland, Middle Mississippian, or Upper Mississippian period sites. One transformation of the landscape that significantly affects our ability to document sites and to understand settlement patterns is the accumulation of sediment in flood plains, which is a direct result of historic agricultural practices and changes in Holocene geomorphic conditions. Even in minor stream valleys, historic alluvium often completely covers the latest prehistoric ground surface, obscuring sites and affecting current interpretations of both historic and prehistoric settlement and land use. Archaeological site surveys should account for both prehistoric settlement patterns and historic transformations of the landscape that affect our current understanding of these patterns.

Though only about 13 percent of the DRAA has been systematically surveyed, and many sites have been destroyed through urban development and agricultural practices, the archaeological record of the DuPage River Assessment Area offers a good opportunity to understand the environmental, social, economic, and political conditions that affected past cultures. Hopefully, any biases in the recorded sites can be overcome and this assessment area will continue to provide the present inhabitants of the area with an understanding of its past.

Acknowledgments

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Selected References for Archaeological Resources in the DuPage River Assessment Area

Bauxar, J, Joseph. 1978. History of the Illinois Area. In *Handbook of North American Indians, Volume 15, Northeast*, edited by B. G. Trigger, pp. 594-601. Smithsonian Institution, Washington D.C.

Bird, M. Catherine. 1995. *Archaeological Reconnaissance Survey of the Proposed Wallin Woods Development, 161 Acres of Land in Plainfield Township, Will County, Illinois*. Report submitted to Clayton Olsen, Naperville Excavating by Midwest Archaeological Research Services, Inc.

Clifton, James A. 1978. Potawatomi. In *Handbook of North American Indians, Volume 15, Northeast*, edited by B. G. Trigger, pp. 725-742. Smithsonian Institution, Washington D.C.

Early, Ann M. 1970. NAL 1970 Archaeological Survey: The Prehistoric Occupations of the National Accelerator Laboratory Site.

Gates, Sanford H. 1961. An Archaeological Survey of the DuPage River Drainage. In *Chicago Area Archaeology*. Illinois Archaeological Survey, Inc. Bulletin No. 3

Goddard, Ives. 1978. Mascouten. In *Handbook of North American Indians*, Volume 15, Northeast, edited by B. G. Trigger, pp. 668-672. Smithsonian Institution, Washington D.C.

Markman, Charles V. 1991. *Chicago Before History, The Prehistoric Archaeology of a Modern Metropolitan Area*. Studies in Illinois Archaeology No. 7, Illinois Historic Preservation Agency

Scharf, Albert F. 1900. Indian Trails and Villages of Chicago, and of Cook, DuPage, and Will Counties, as Shown by Weapons and Implements of the Stone Age. Map privately published in Chicago, reprinted by the Chicago Historical Society.

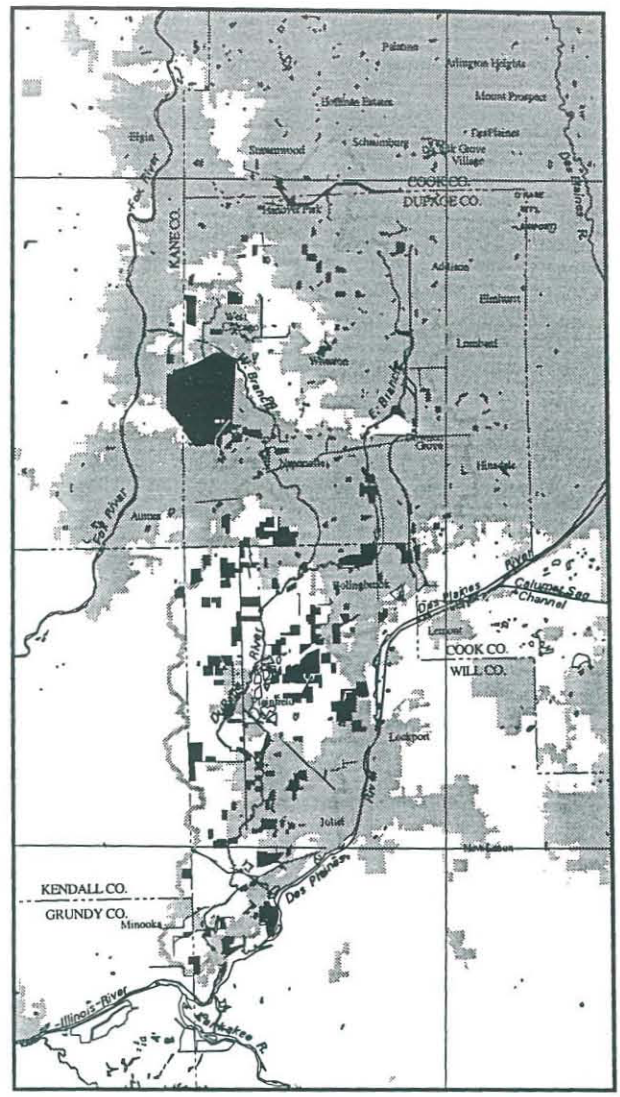
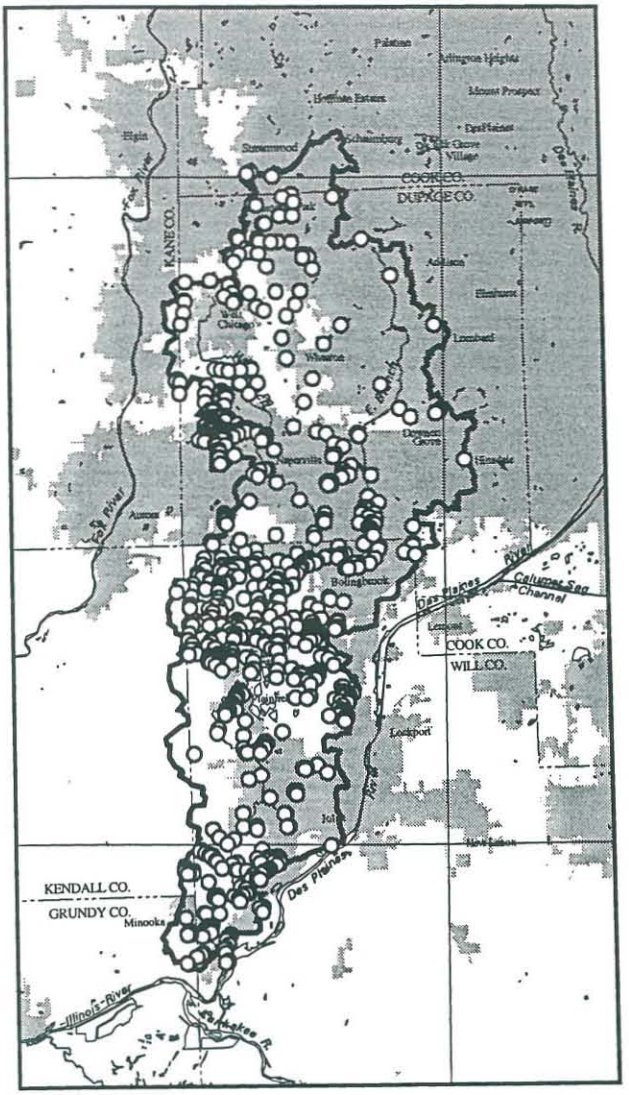
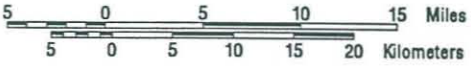


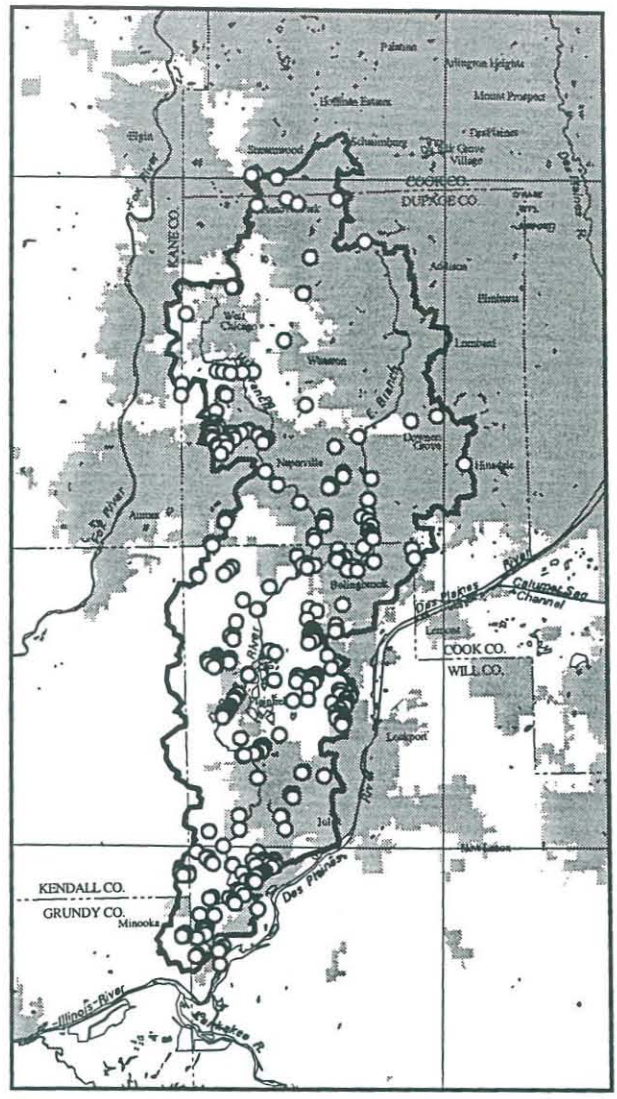
Figure 3 –1. Archaeological survey areas.

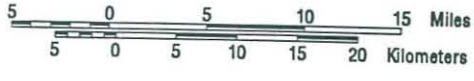




° Archaeological sites

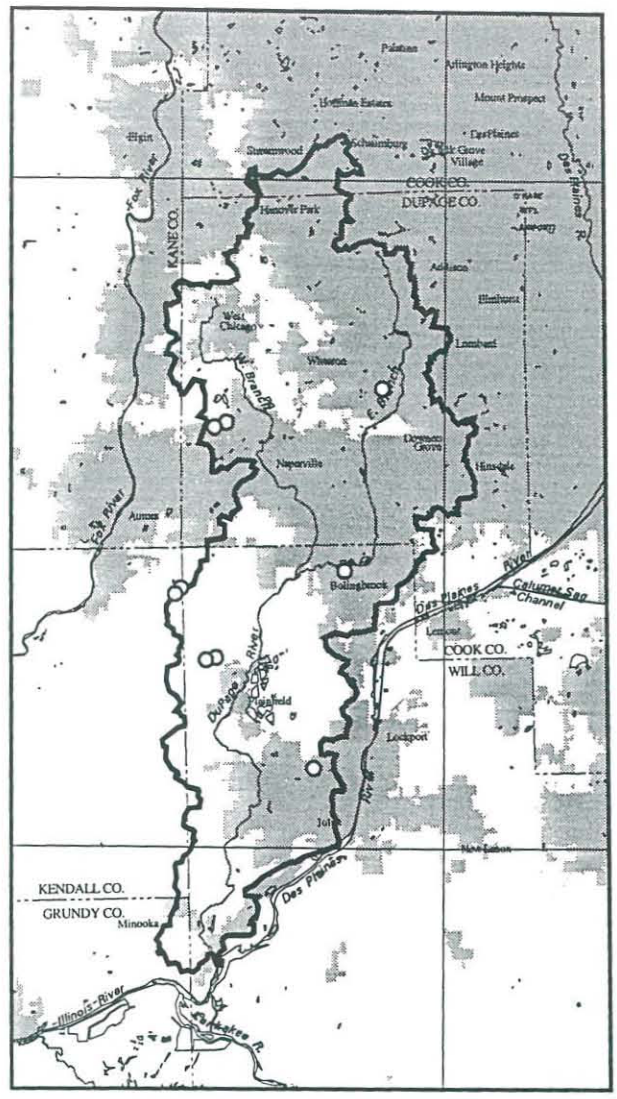
Figure 3-2. All archaeological components.

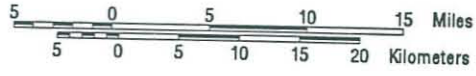




° Archaeological sites

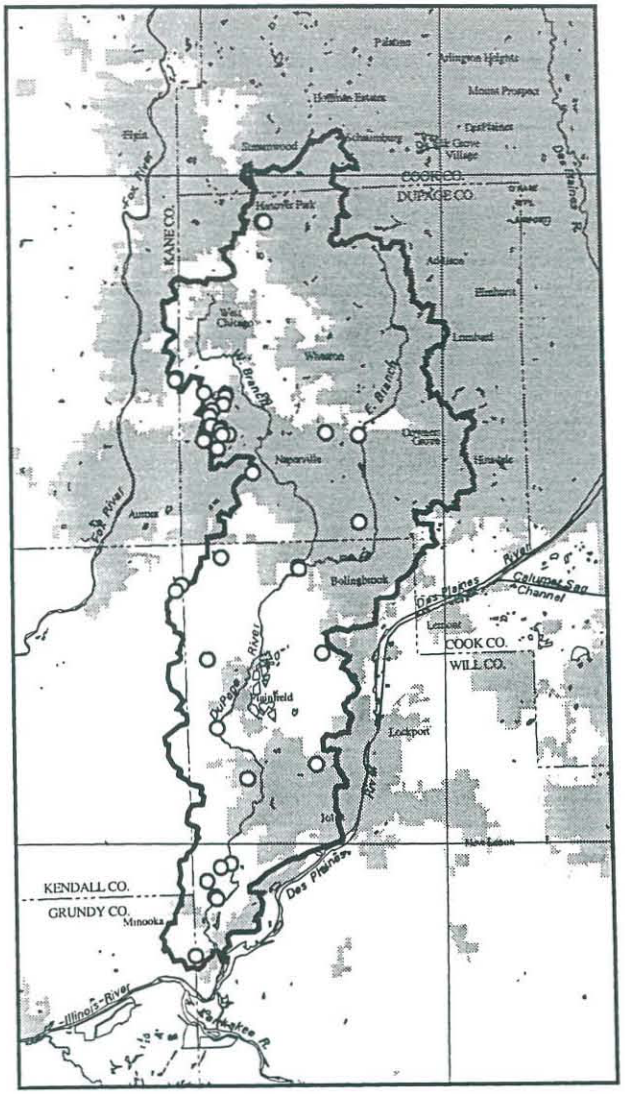
Figure 3-3. Unidentified Prehistoric archaeological components.

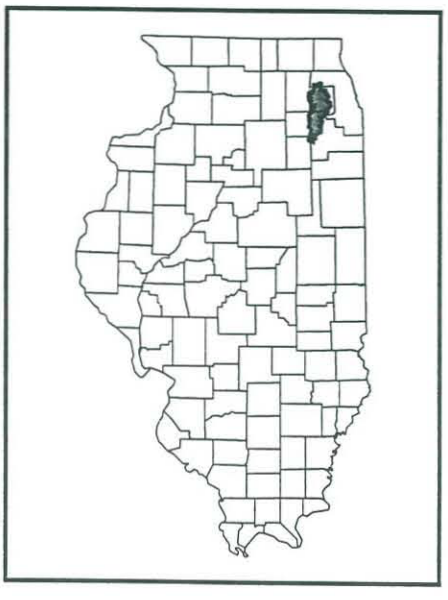




° Archaeological sites

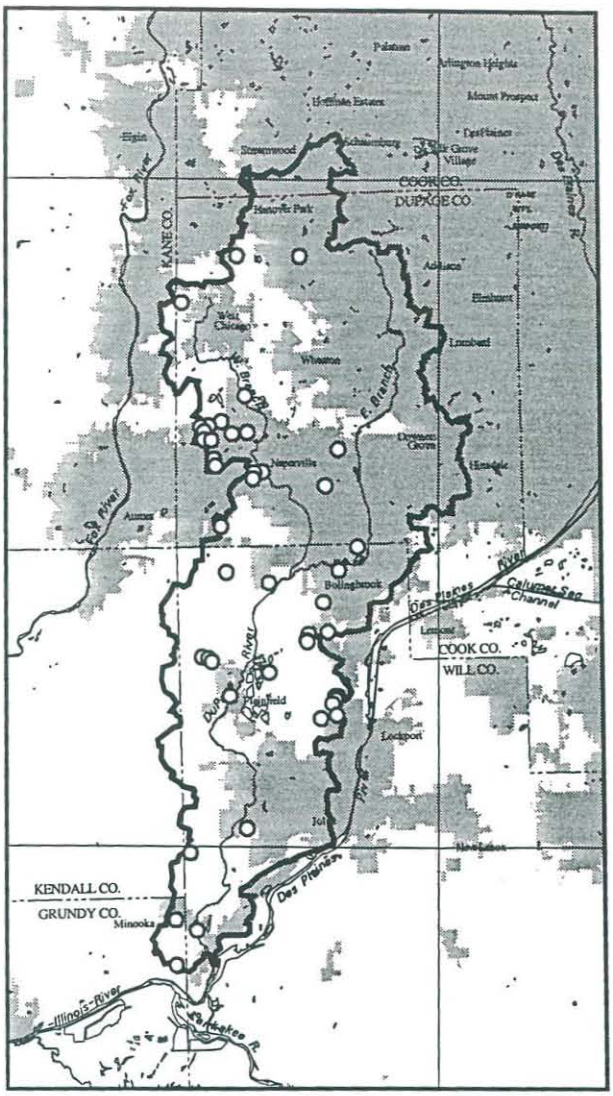
Figure 3-4. Paleo-Indian archaeological components.





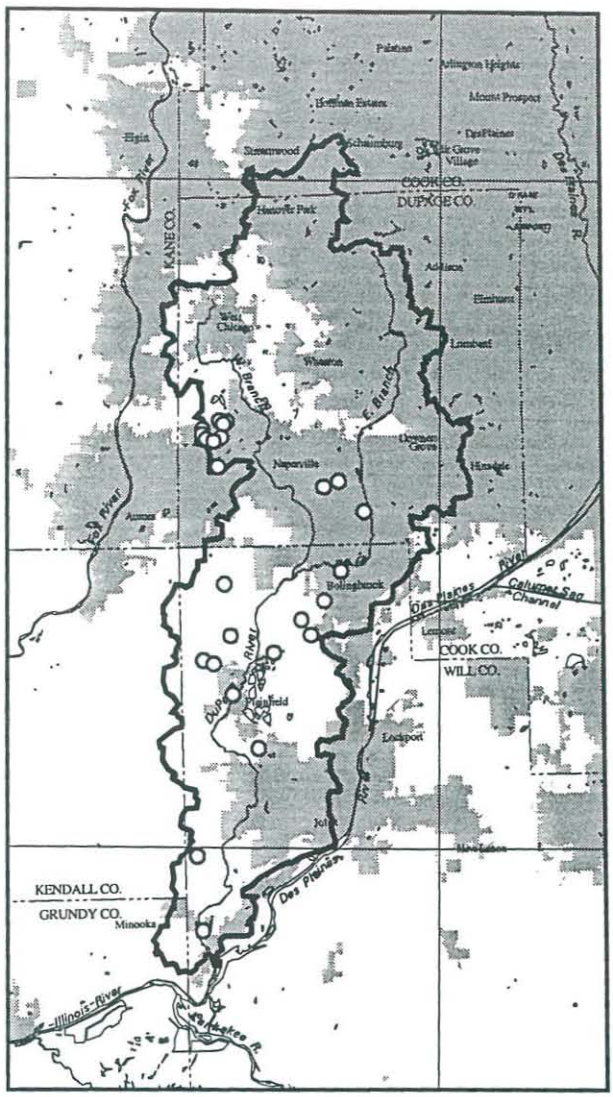
° Archaeological sites

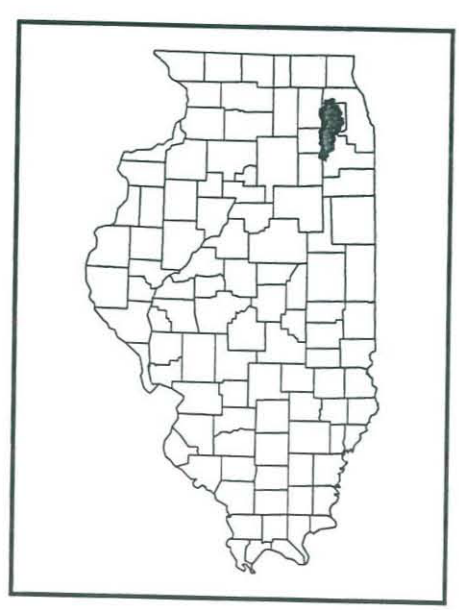
Figure 3-5. Unidentified Archaic archaeological components.



° Archaeological sites

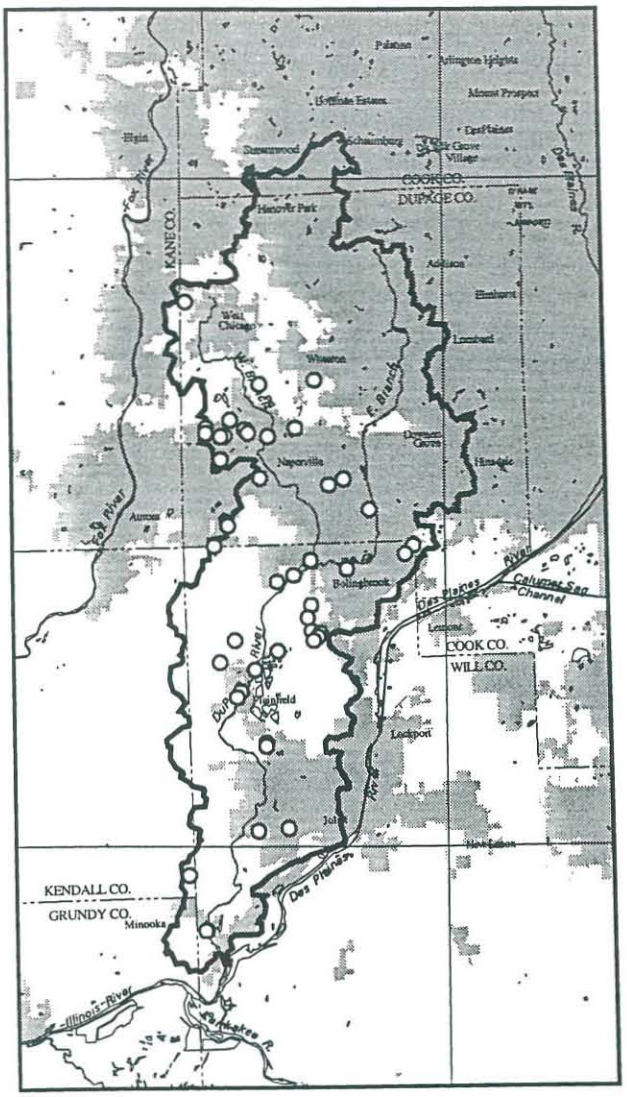
Figure 3-6. Early Archaic archaeological components.





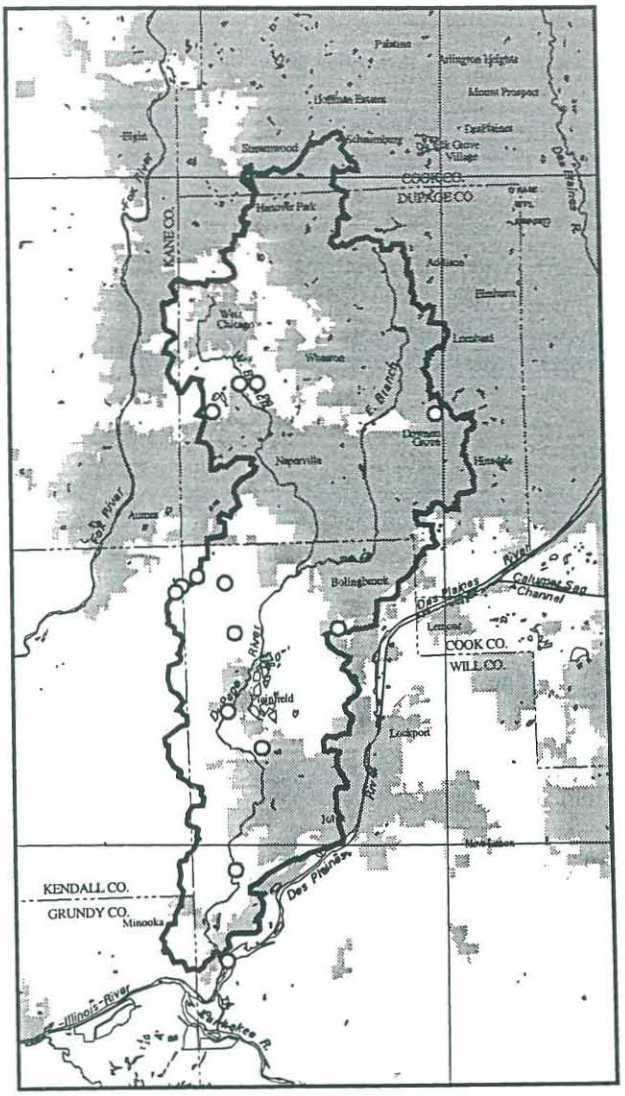
○ Archaeological sites

Figure 3-7. Middle Archaic archaeological components.



° Archaeological sites

Figure 3-8. Late Archaic archaeological components.



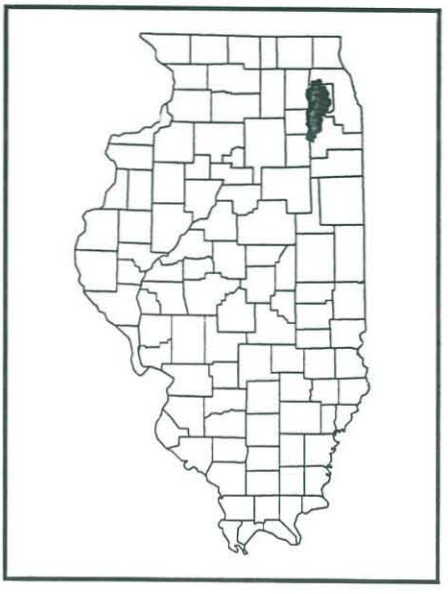
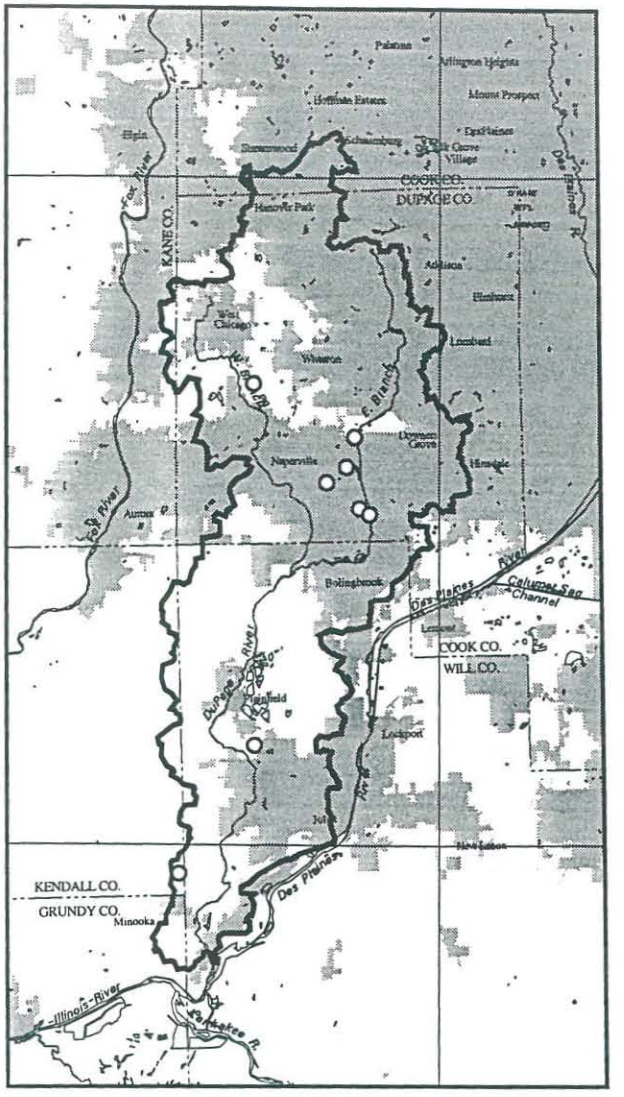
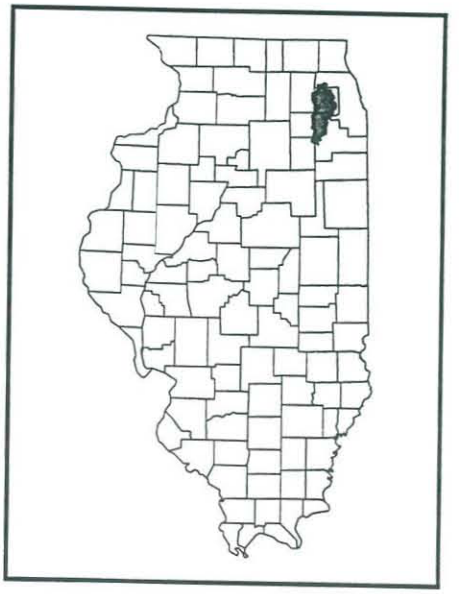


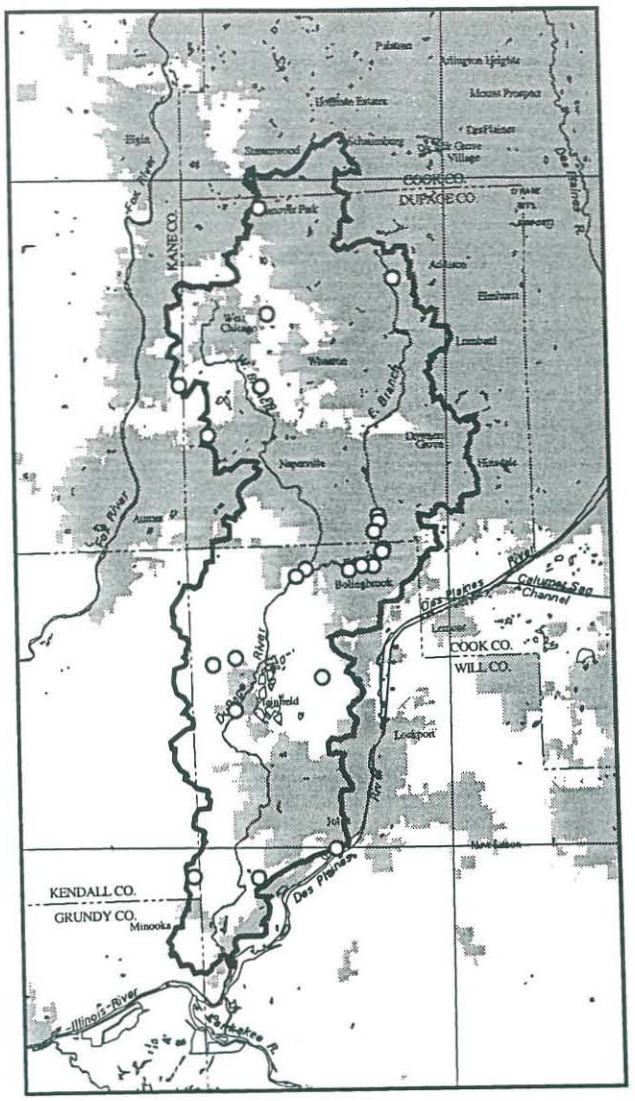
Figure 3-9. Unidentified Woodland archaeological components.





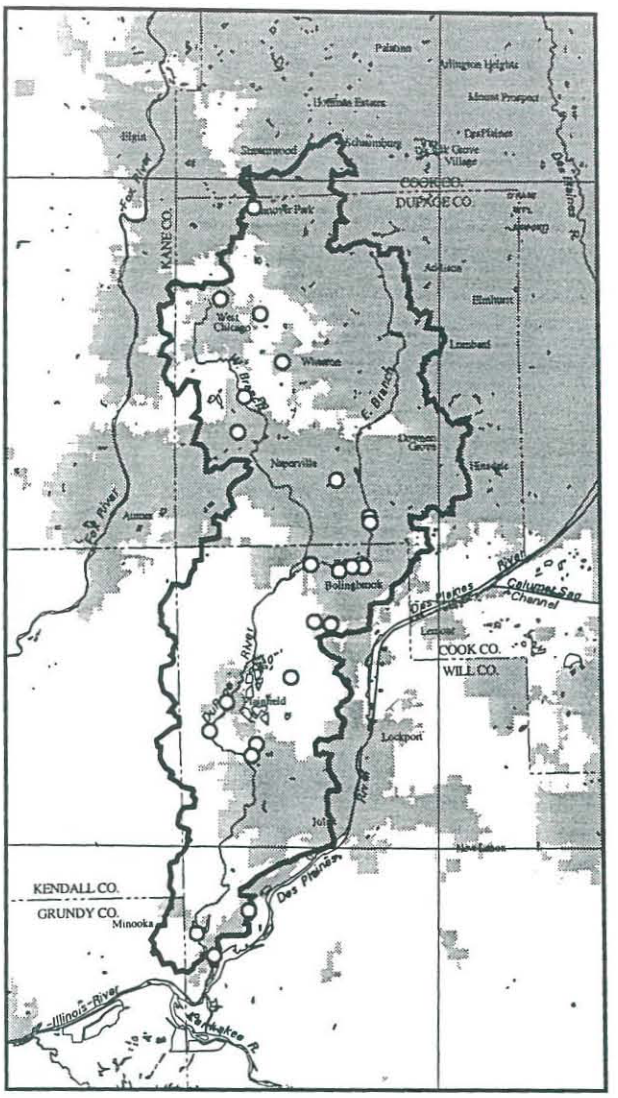
° Archaeological sites

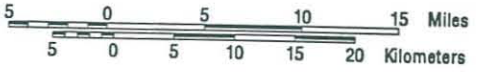
Figure 3-10. Early Woodland archaeological components.



° Archaeological sites

Figure 3-11. Middle Woodland archaeological components.





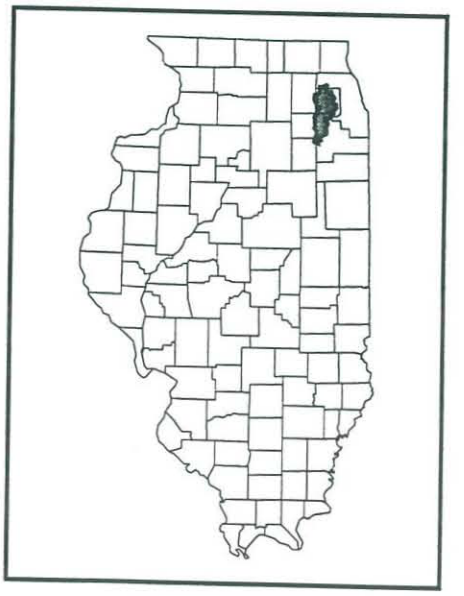


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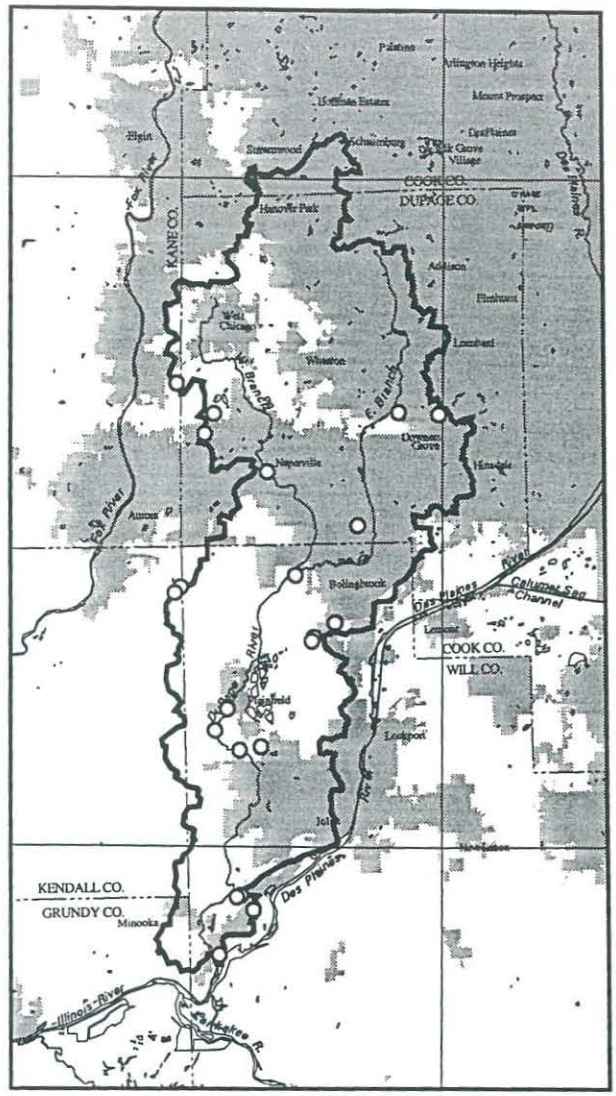
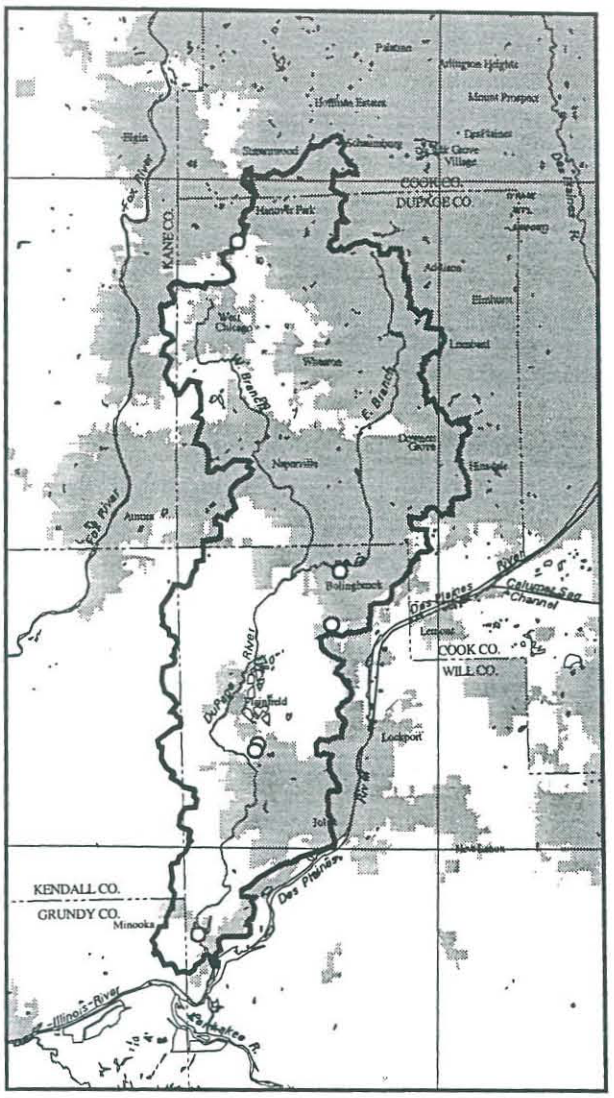
Figure 3-12. Late Woodland archaeological components.



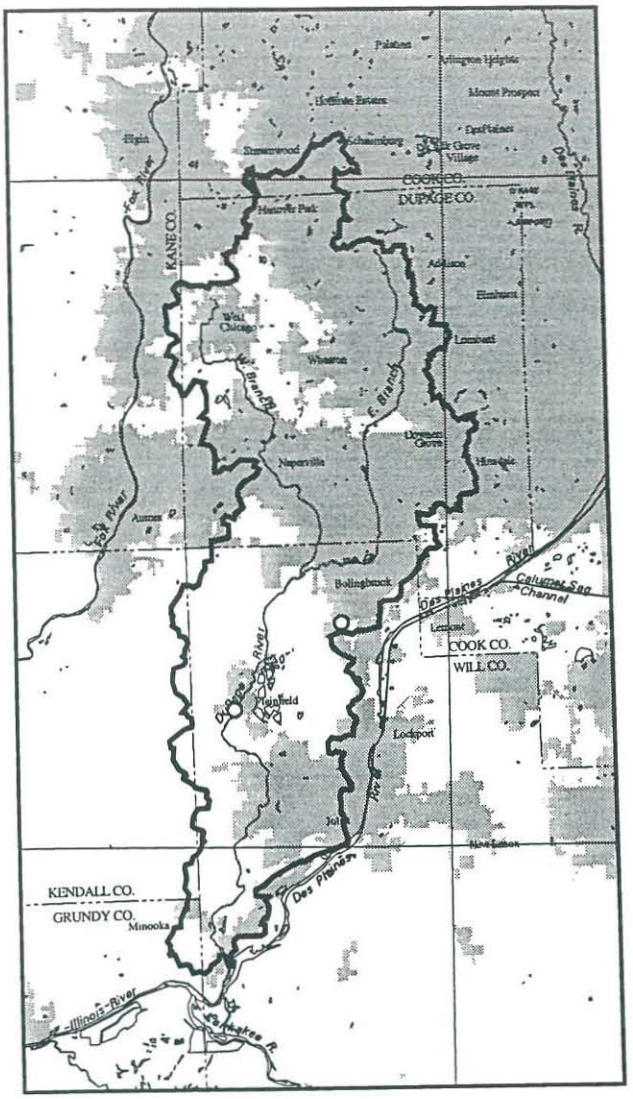
° Archaeological sites

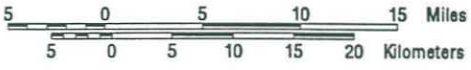
Figure 3-13. Mississippian archaeological components.



° Archaeological sites

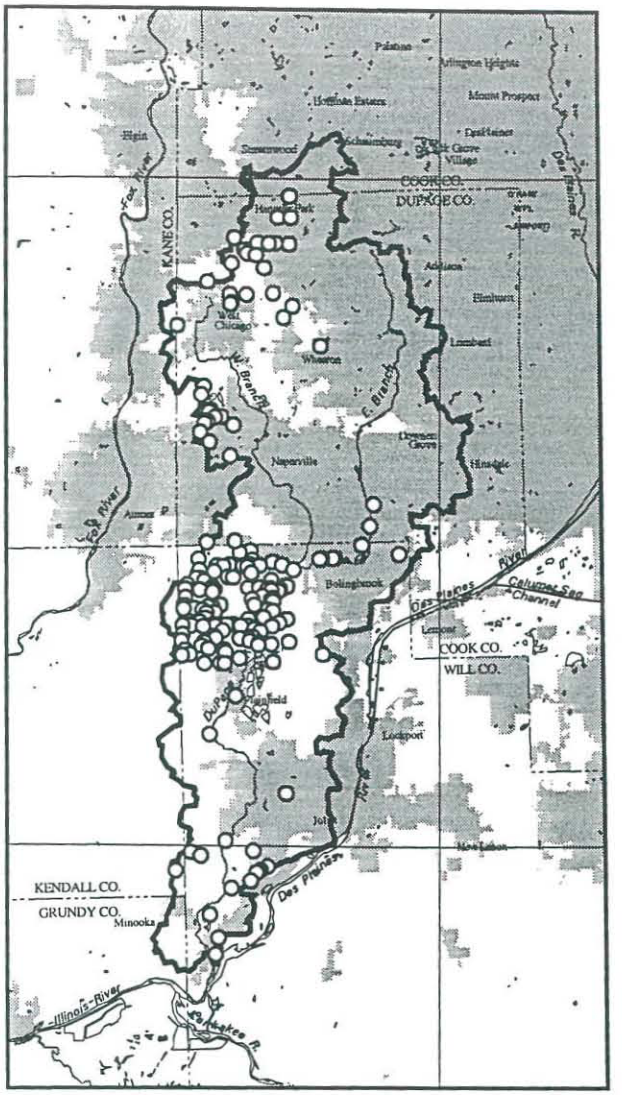
Figure 3-14. Upper Mississippian archaeological components.

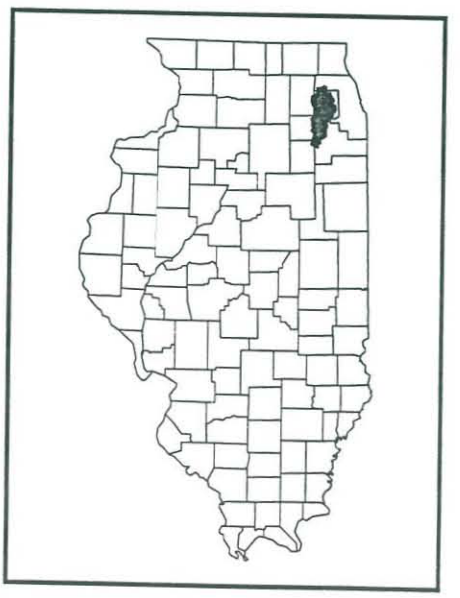




° Archaeological sites

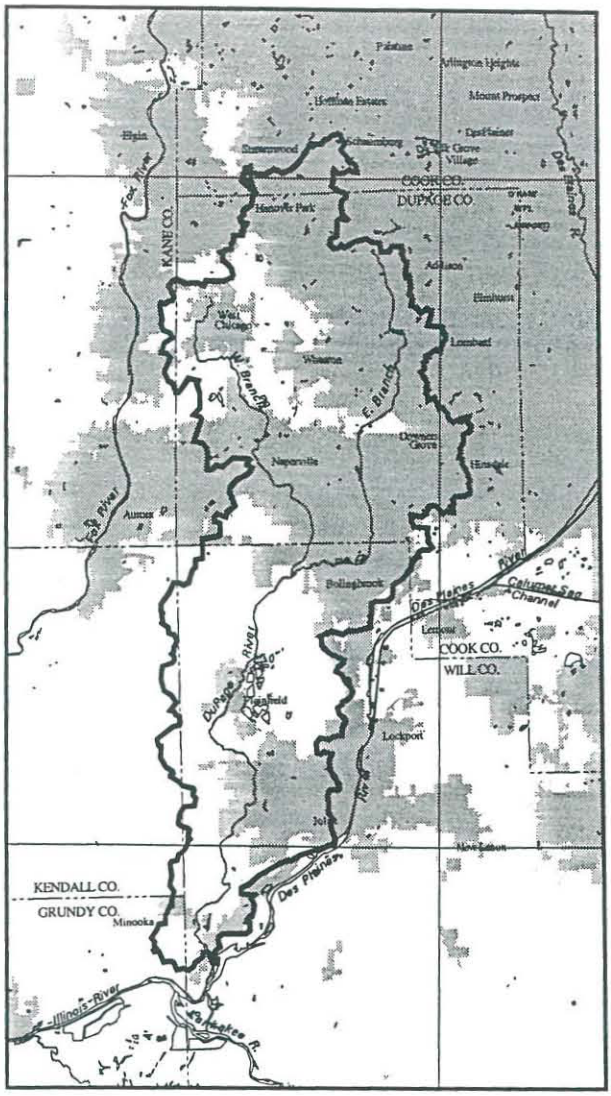
Figure 3-15. Protohistoric archaeological components.





° Archaeological sites

Figure 3-16. Unidentified Historic archaeological components.



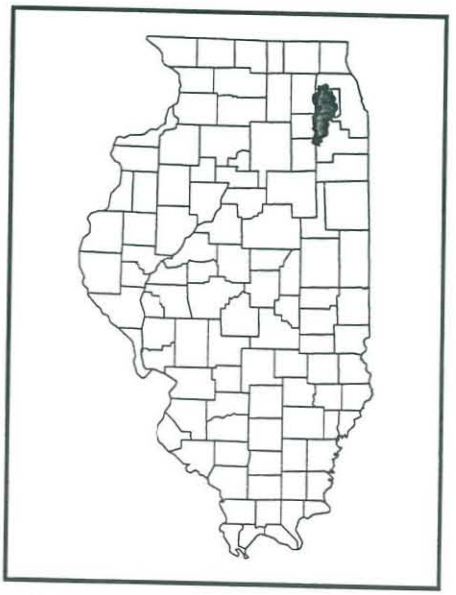


Figure 3-17. Historic Native American archaeological components.

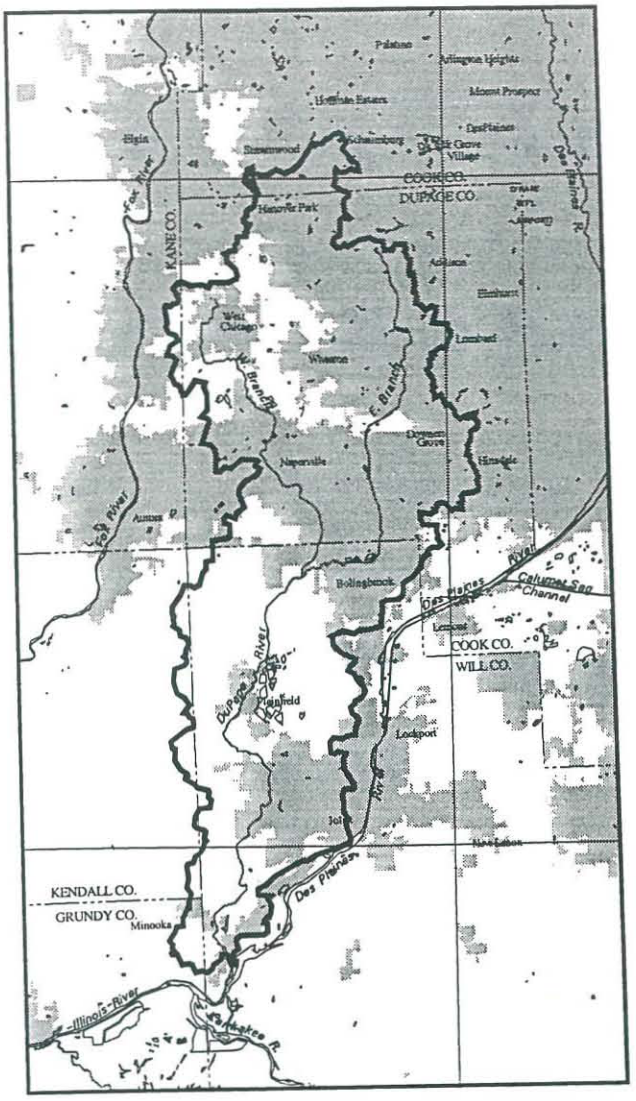


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Figure 3-18. Historic Colonial archaeological components.

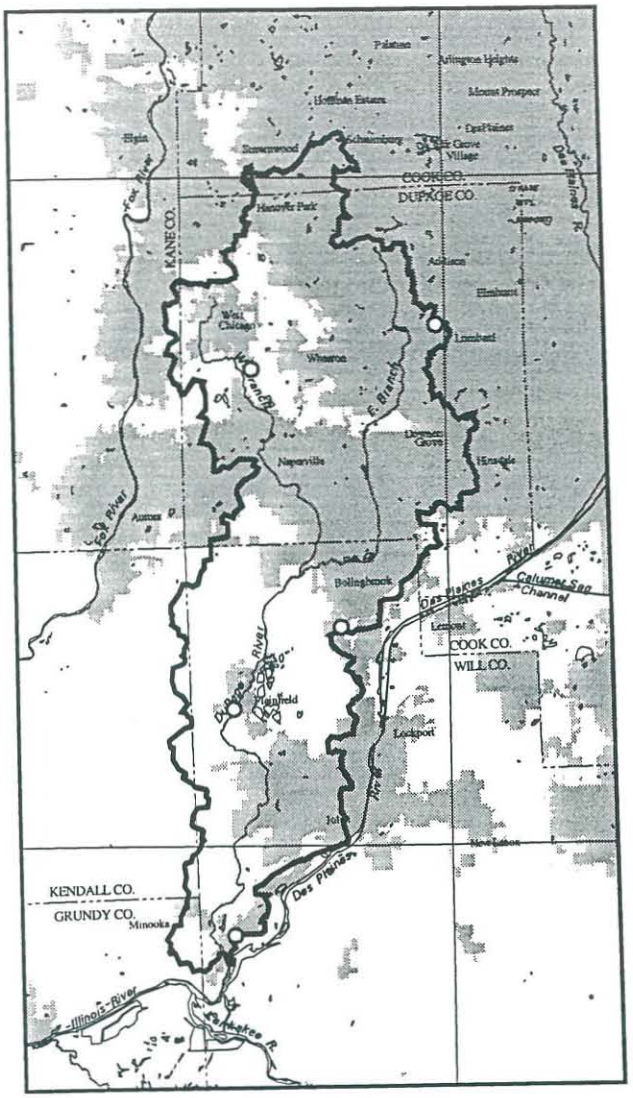

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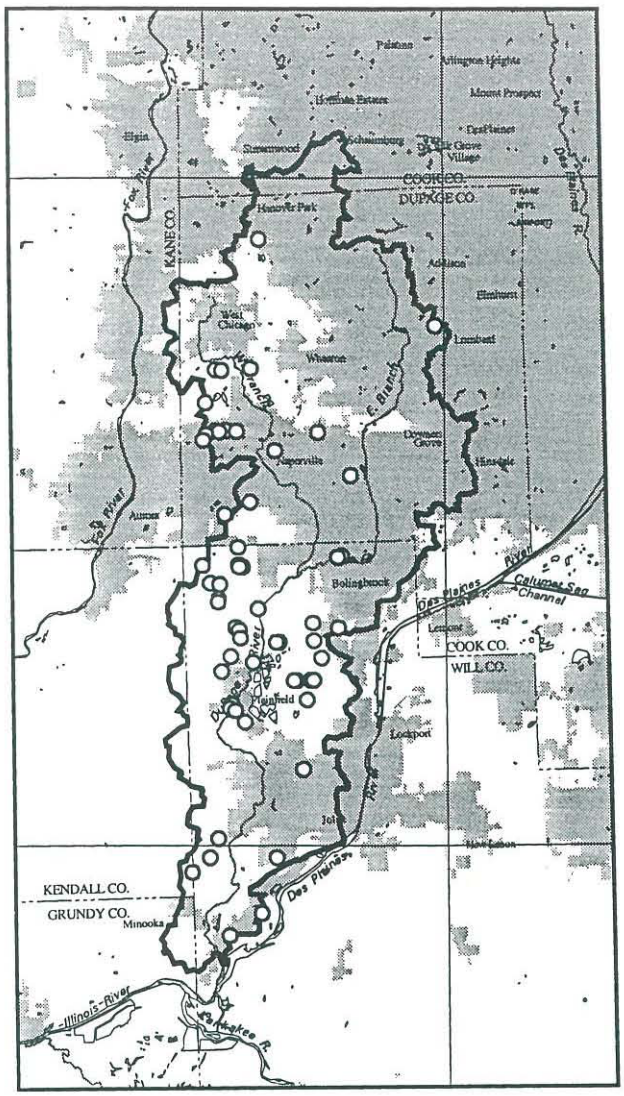
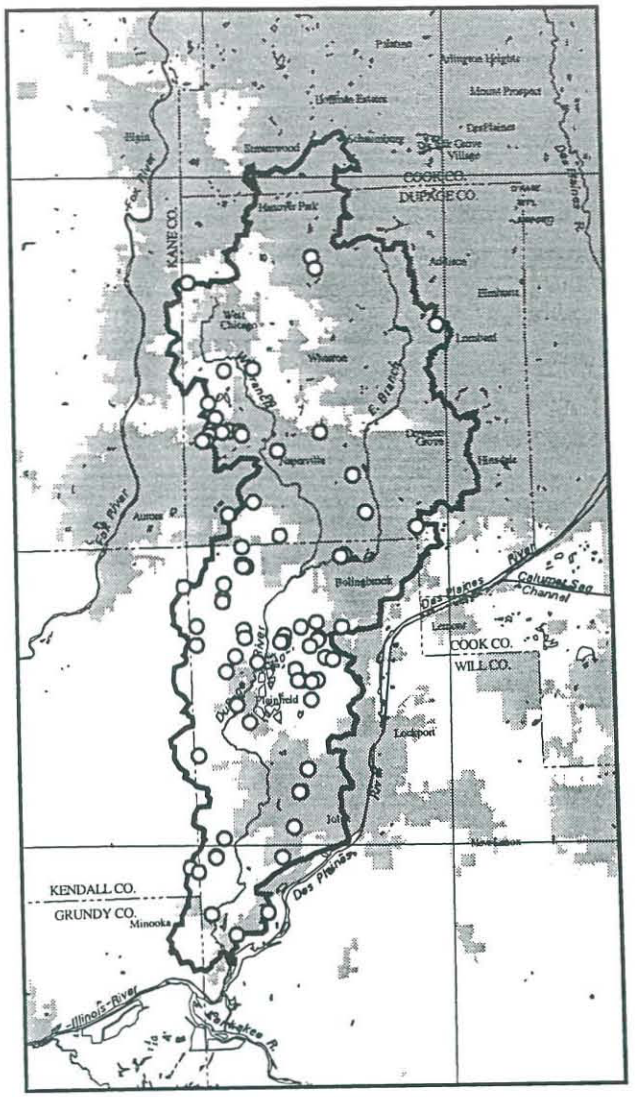
Figure 3-19. Historic Pioneer archaeological components.



o Archaeological sites

Figure 3-20. Historic Frontier archaeological components.



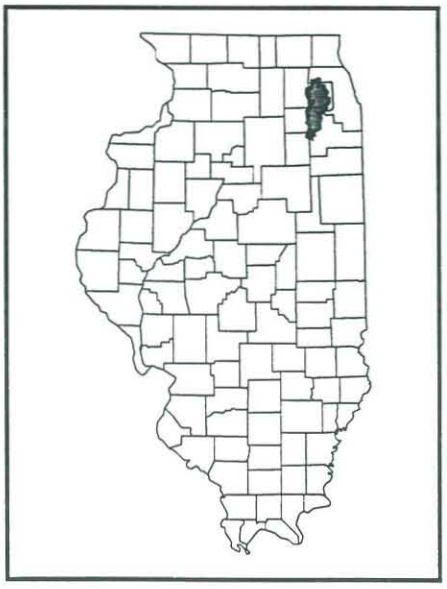
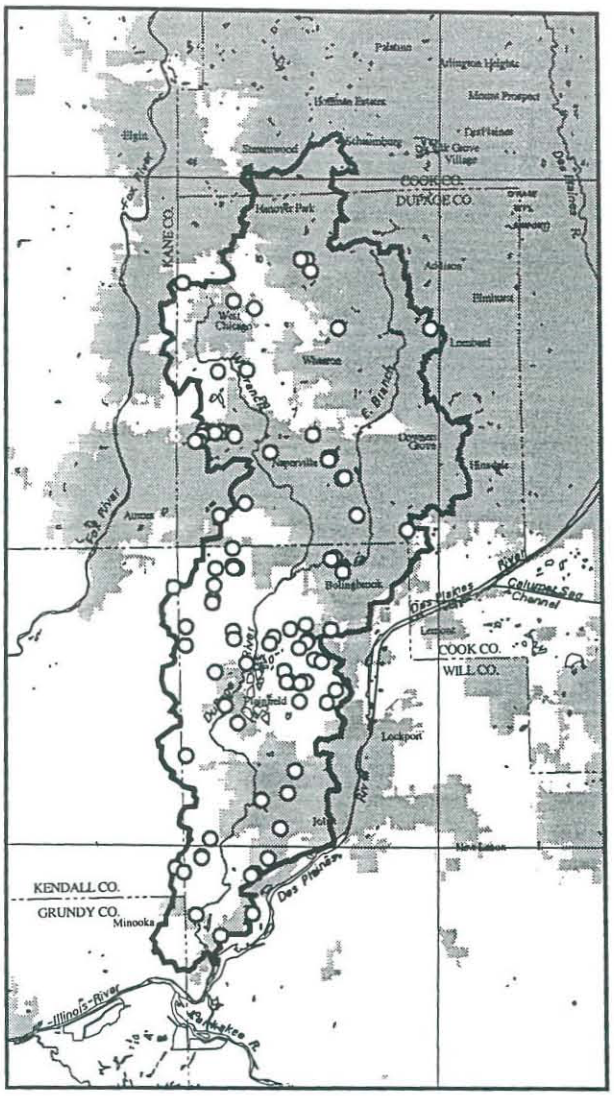
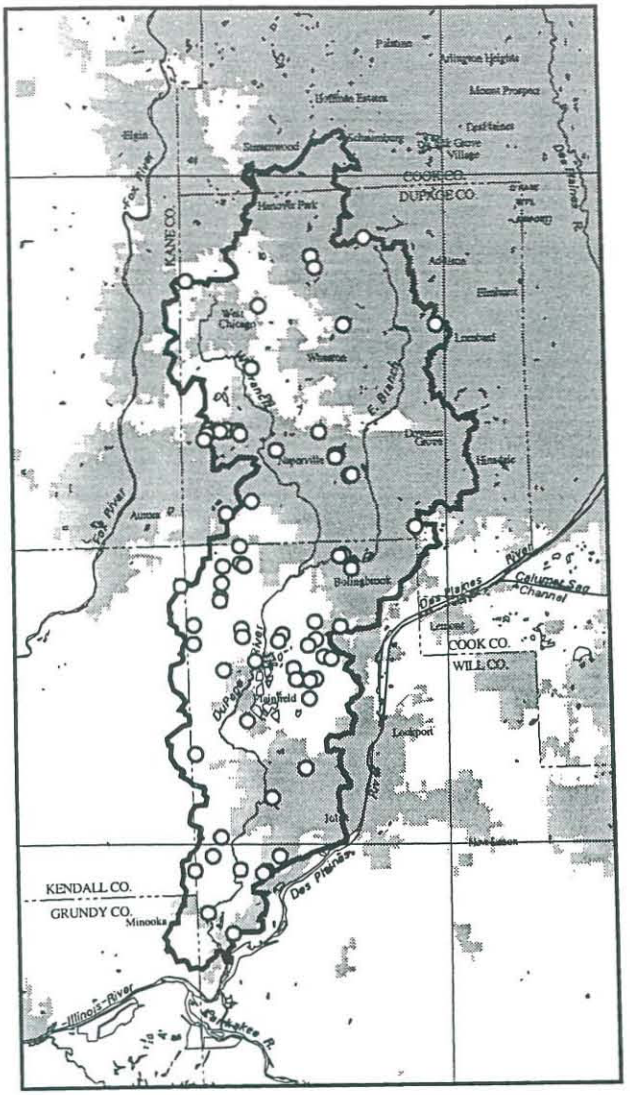


Figure 3-21. Historic Early Industrial archaeological components.



° Archaeological sites

Figure 3-22. Historic Urban Industrial archaeological components.



° Archaeological sites

Figure 3-23. Historic Postwar archaeological components.